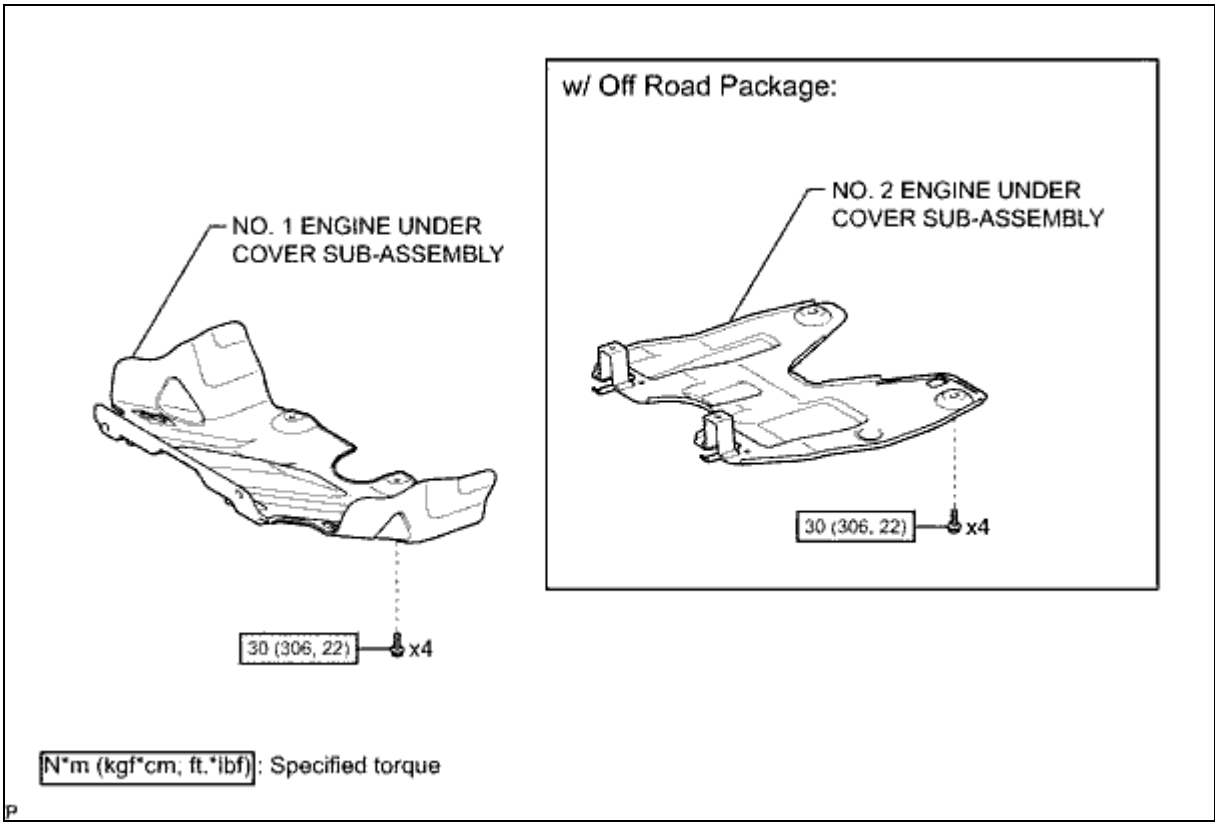
Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM0000018ZC04XX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2GR-FKS): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

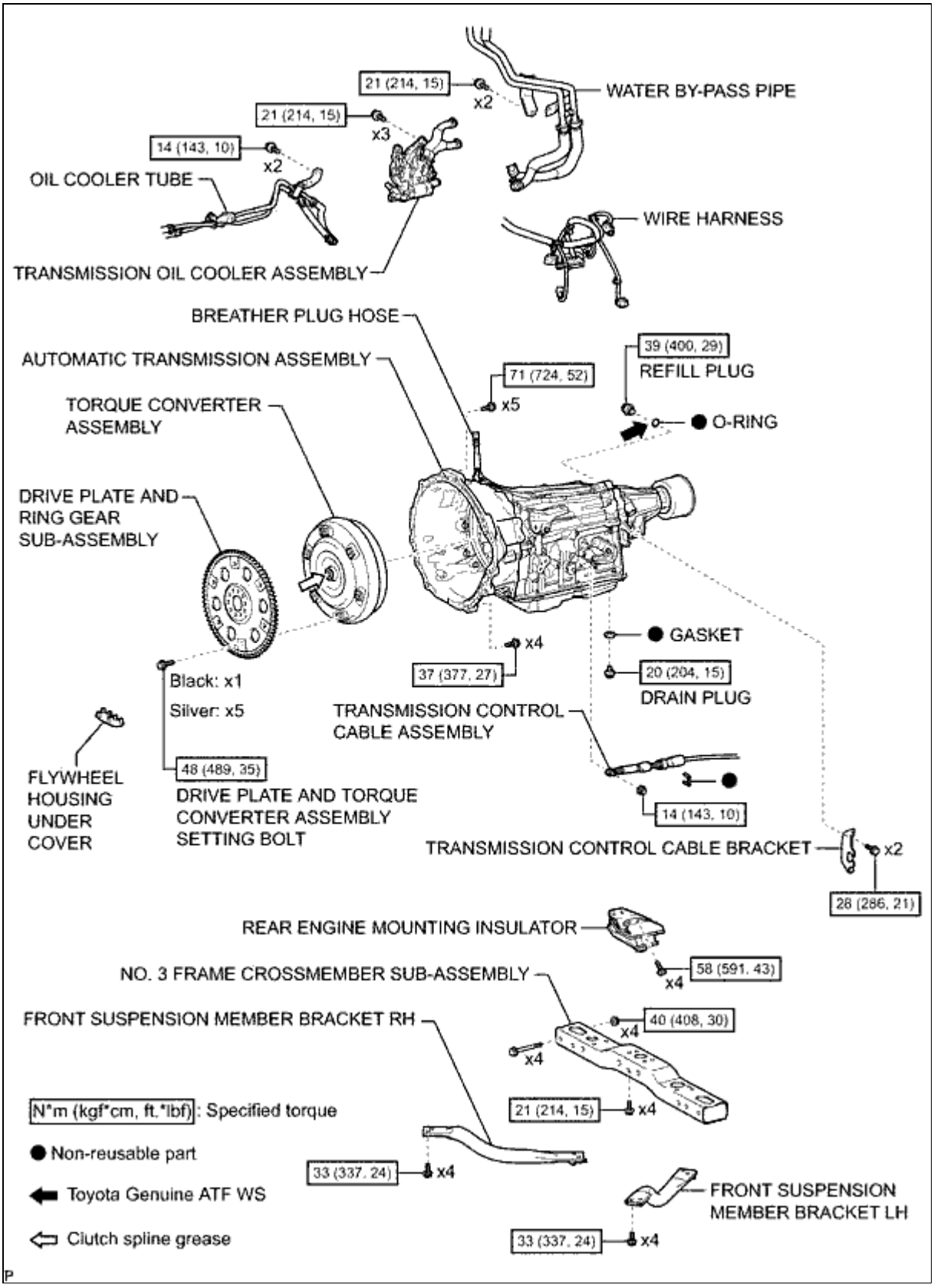
COMPONENTS

ILLUSTRATION



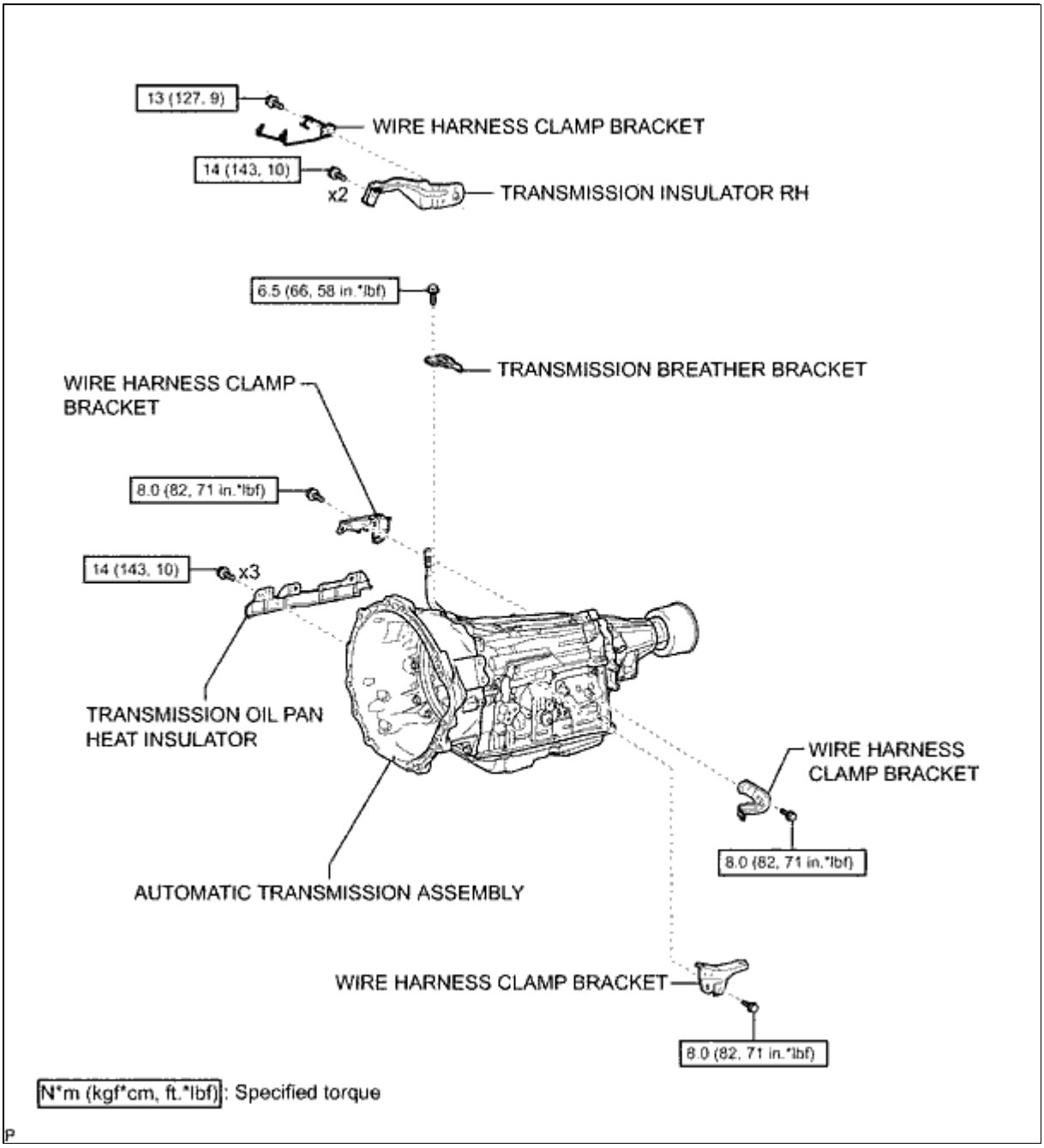
ILLUSTRATION

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000018ZB066X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2GR-FKS): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL WIRE HARNESS CLAMP BRACKET

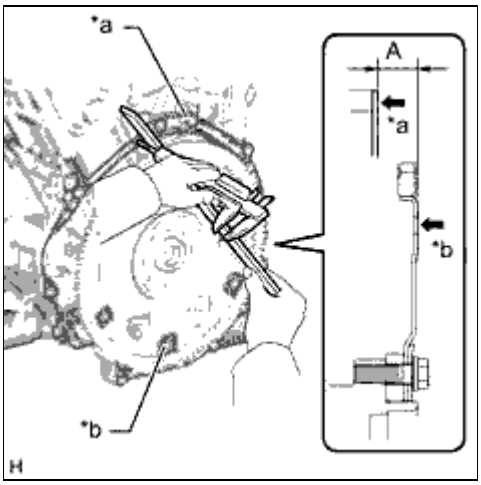
HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.

(a) Attach the 7 clamps and claw to install the 3 wire harness clamp brackets to the wire harness.

2. INSTALL TORQUE CONVERTER ASSEMBLY

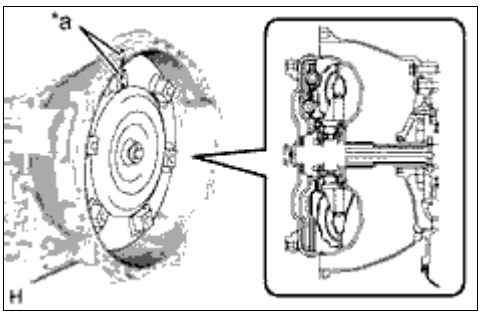
(a) Using a vernier caliper and straightedge, measure the dimension (A) between the automatic transmission assembly contact surface of the engine assembly (*a) and the torque converter assembly contact surface of the drive plate (*b).



Text in Illustration

*a	Engine Surface
*b	Drive Plate Surface

(b) Align the matchmark on the automatic transmission case sub-assembly with the one on the torque converter assembly and engage the splines of the input shaft with the turbine runner splines.



Text in Illustration

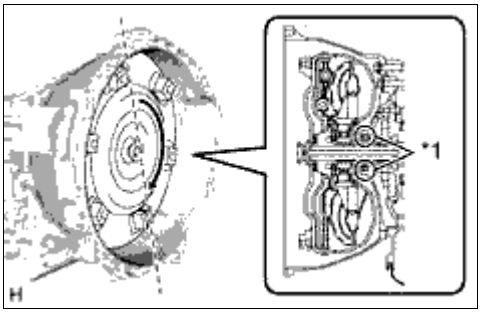
*a	Matchmark

NOTICE:

Install the torque converter assembly to the input shaft while keeping it horizontal.

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(c) Rotate the torque converter assembly approximately 180° and engage the splines of the stator shaft with the stator assembly.



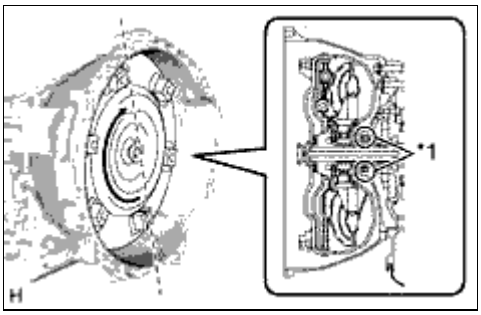
Text in Illustration

*1	Front Oil Pump Oil Seal

NOTICE:

- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(d) Rotate the torque converter assembly approximately 180° again, align the matchmark on the torque converter assembly with the one on the automatic transmission case sub-assembly and insert the key of the torque converter assembly into the groove of the oil pump drive gear.



Text in Illustration

*1	Front Oil Pump Oil Seal

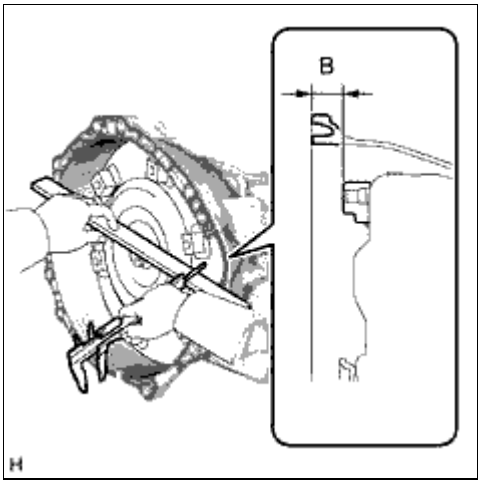
NOTICE:

- Do not push the torque converter assembly excessively when rotating it.
- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(e) Using a vernier caliper and straightedge, measure the dimension (B) shown in the illustration and check that the dimension (B) is more than the dimension (A), which was measured in the previous step.

Standard distance:

B = A + 1 mm (0.0394 in.) or more



NOTICE:

- Make sure to deduct the thickness of the straightedge.
- If the automatic transmission assembly is installed to the engine assembly with the torque converter assembly not sufficiently inserted, the torque converter assembly may be damaged.

3. INSTALL TRANSMISSION OIL PAN HEAT INSULATOR

HINT:

It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

(a) Install the transmission oil pan heat insulator to the automatic transmission assembly with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

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4. INSTALL TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

(a) Install the transmission control cable bracket to the automatic transmission assembly with the 2 bolts.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

5. INSTALL TRANSMISSION BREATHER BRACKET

HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

(a) Install the transmission breather bracket to the automatic transmission assembly with the bolt.

Torque:

6.5 N·m {66 kgf·cm, 58in·lbf}

6. INSTALL TRANSMISSION OIL COOLER ASSEMBLY

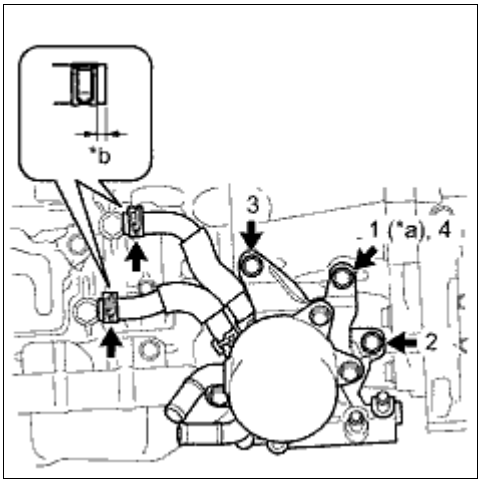
NOTICE:

Make sure to install the clips so that the spool fitting is not overlapped.

HINT:

It is not necessary to remove the transmission oil cooler assembly unless it is being replaced.

(a) Install the transmission oil cooler assembly with transmission oil thermostat to the automatic transmission assembly with the 3 bolts in the order shown in the illustration.



Text in Illustration

*a	Temporarily Tighten
*a	2 to 7 mm (0.0788 to 0.2755 in.)

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

(b) Connect the 2 oil cooler hoses to the automatic transmission assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

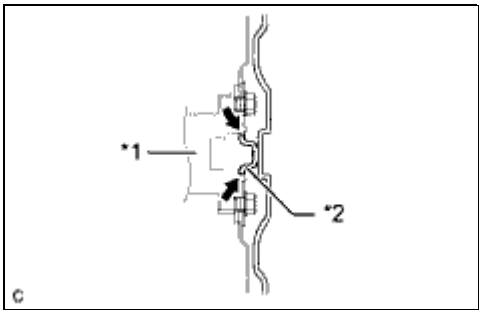
7. INSTALL FLYWHEEL HOUSING UNDER COVER

(a) Install the flywheel housing under cover to the engine assembly.

8. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY

(a) Apply clutch spline grease to the surface of the crankshaft that contacts the torque converter assembly centerpiece.

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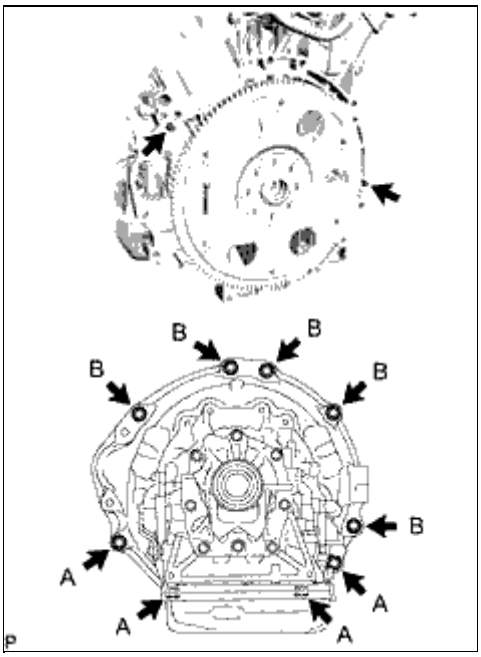


Text in Illustration

*1	Crankshaft
*2	Torque Converter Assembly Centerpiece
➡	Clutch Spline Grease

Clutch spline grease:
Toyota Genuine Clutch Spline Grease or equivalent
Maximum grease amount
Approximately 1 g (0.0353 oz.)

(b) Confirm that the 2 knock pins are installed on the engine assembly and are not damaged.



(c) While keeping the engine assembly and automatic transmission assembly horizontal, align the 2 knock pins with the holes in the automatic transmission assembly and install the 9 bolts.

Torque:
for Bolt A -
37 N·m {377 kgf·cm, 27ft·lbf}
for Bolt B -
71 N·m {724 kgf·cm, 52ft·lbf}

NOTICE:

- Do not use excessive force when installing the automatic transmission assembly.
- Check that the torque converter assembly rotates.

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- Make sure that the wire harness or other similar items are not pinched between the contact surfaces.
- Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

9. CONNECT WIRE HARNESS

(a) Tilt down the automatic transmission assembly.

NOTICE:

Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Attach the clamp to connect the wire harness to the automatic transmission assembly.

(c) Connect the 3 wire harness clamp brackets to the automatic transmission assembly with the 3 bolts.

Torque:

8.0 N·m {82 kgf·cm, 71in·lbf}

(d) Connect the park/neutral position switch connector, transmission wire connector and 2 transmission revolution sensor connectors.

HINT:

Push up the lever until the claw of the transmission wire connector makes a connection sound.

10. CONNECT BREATHER PLUG HOSE

(a) Attach the 2 clamps to connect the breather plug hose to the transmission breather bracket and wire harness.

11. INSTALL REAR ENGINE MOUNTING INSULATOR

(a) Install the rear engine mounting insulator to the automatic transmission assembly with the 4 bolts.

Torque:

58 N·m {591 kgf·cm, 43ft·lbf}

12. INSTALL NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

(a) Install the No. 3 frame crossmember sub-assembly to the vehicle body with the 4 bolts and 4 nuts.

Torque:

40 N·m {408 kgf·cm, 30ft·lbf}

NOTICE:

Install the nuts so that they face the rear of the vehicle.

HINT:

Hold the bolts while tightening the nuts.

(b) Connect the No. 3 frame crossmember sub-assembly to the rear engine mounting insulator with the 4 bolts.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

13. INSTALL FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Install the front suspension member bracket LH and front suspension member bracket RH to the No. 3 frame crossmember sub-assembly and vehicle body with the 8 bolts.

Torque:

33 N·m {337 kgf·cm, 24ft·lbf}

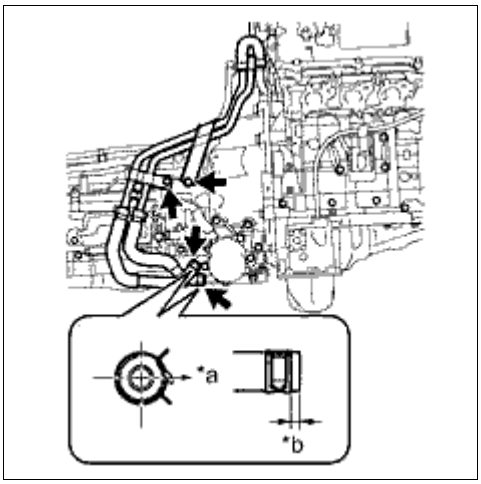
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14. CONNECT WATER BY-PASS PIPE

NOTICE:

Make sure to install the clips so that the spool fitting is not overlapped.

(a) Connect the water by-pass pipe to the automatic transmission assembly with the 2 bolts.



Text in Illustration

*a	RH Side
*b	2 to 7 mm (0.0788 to 0.2755 in.)

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

(b) Connect the 2 water by-pass hoses to the transmission oil cooler assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

15. CONNECT OIL COOLER TUBE

NOTICE:

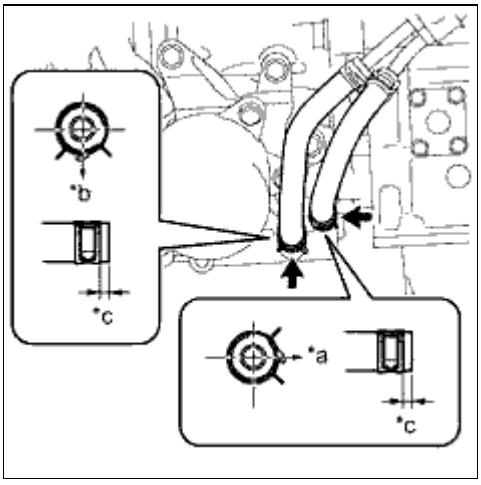
Make sure to install the clips so that the spool fitting is not overlapped.

(a) Connect the 2 oil cooler tubes to the automatic transmission assembly and engine assembly with the 2 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Connect the 2 oil cooler hoses to the transmission oil thermostat, and slide the 2 clips to secure them.



Text in Illustration

*a	Front Side
*b	Lower Side
*c	2 to 7 mm (0.0788 to 0.2755 in.)

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

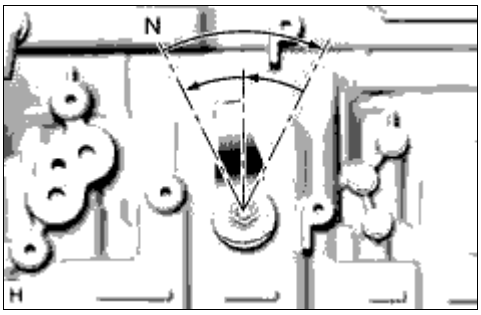
16. INSTALL TRANSMISSION INSULATOR RH INFO

17. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

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(a) Move the shift lever to N.

(b) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(c) Connect the transmission control cable assembly to the transmission control shaft lever LH with the nut.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(d) Connect the transmission control cable assembly to the transmission control cable bracket with a new clip.

18. INSTALL DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

(a) Turn the crankshaft to gain access to the installation locations of the 6 drive plate and torque converter assembly setting bolts and install each bolt while holding the crankshaft pulley bolt with a wrench.

Torque:

48 N·m {489 kgf·cm, 35ft·lbf}

NOTICE:

Install the black colored bolt first, and then the remaining 5 silver colored bolts.

19. INSTALL STARTER ASSEMBLY

INFO

20. INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY LH

INFO

21. INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

22. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

23. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

24. ADD ENGINE COOLANT INFO

25. ADD AUTOMATIC TRANSMISSION FLUID

INFO

26. INSPECT SHIFT LEVER POSITION INFO

27. INSPECT FOR COOLANT LEAK INFO

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28. INSPECT FOR OIL LEAK

(a) Start the engine. Make sure that there are no oil leaks from the areas that were worked on.

29. INSPECT FOR EXHAUST GAS LEAK INFO

30. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

31. INSTALL NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

32. RESET MEMORY

INFO

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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2GR-FKS): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

CAUTION:

The automatic transmission assembly is very heavy. Be sure to follow the procedure described in the repair manual, or the engine lifter may suddenly drop.

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

3. REMOVE NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

4. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

5. DRAIN ENGINE COOLANT INFO

6. DRAIN AUTOMATIC TRANSMISSION FLUID INFO

7. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

8. REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY LH

INFO

9. REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

10. REMOVE STARTER ASSEMBLY

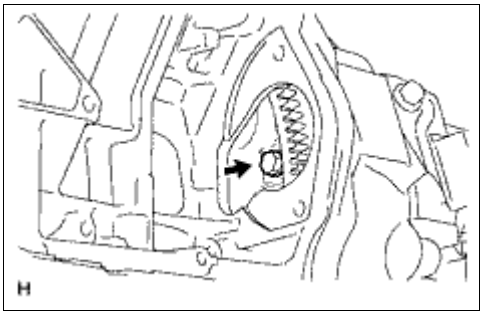
INFO

11. REMOVE DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

(a) Turn the crankshaft to gain access to the removable locations of the 6 drive plate and torque converter assembly setting bolts and remove each bolt while holding the crankshaft pulley bolt with a wrench.

HINT:

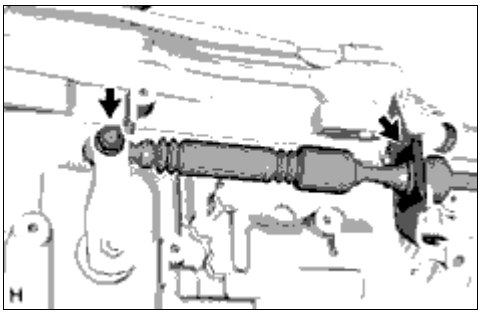
There will be one black colored bolt.



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12. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Remove the clip and nut and disconnect the transmission control cable assembly from the transmission control shaft lever LH and transmission control cable bracket.



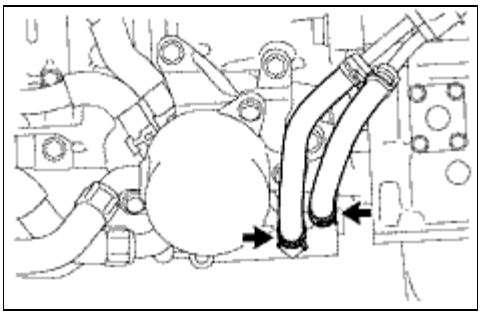
13. REMOVE TRANSMISSION INSULATOR RH INFO

14. DISCONNECT OIL COOLER TUBE

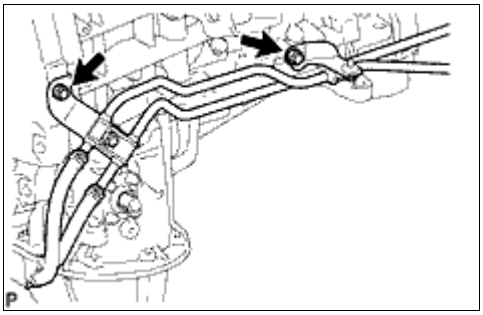
(a) Slide the 2 clips and disconnect the 2 oil cooler hoses from the transmission oil thermostat.

HINT:

Use a container to catch any ATF.



(b) Remove the 2 bolts and disconnect the 2 oil cooler tubes from the automatic transmission assembly and engine assembly.

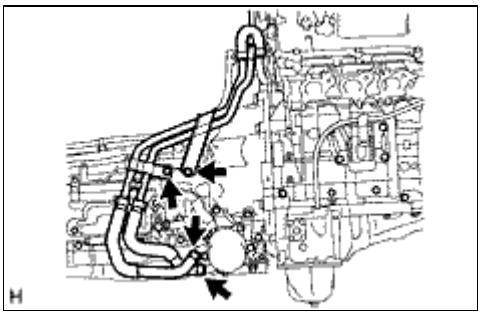


15. DISCONNECT WATER BY-PASS PIPE

(a) Slide the 2 clips and disconnect the 2 water by-pass hoses from the transmission oil cooler assembly.

HINT:

Use a container to catch any coolant.

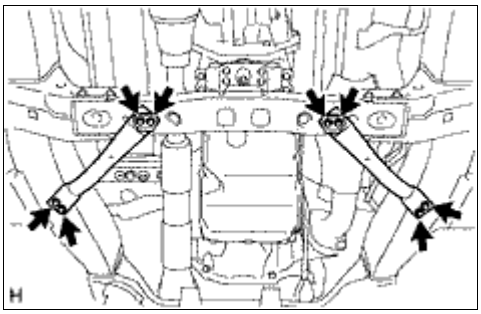


(b) Remove the 2 bolts and disconnect the water by-pass pipe from the automatic transmission assembly.

16. REMOVE FRONT SUSPENSION MEMBER BRACKET LH AND RH

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(a) Remove the 8 bolts, front suspension member bracket LH and front suspension member bracket RH from the No. 3 frame crossmember sub-assembly and vehicle body.

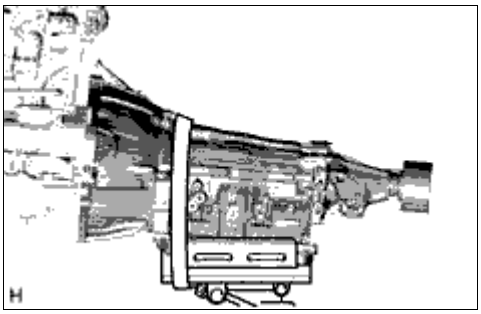


17. SUPPORT AUTOMATIC TRANSMISSION ASSEMBLY

(a) Support the automatic transmission assembly with a transmission jack.

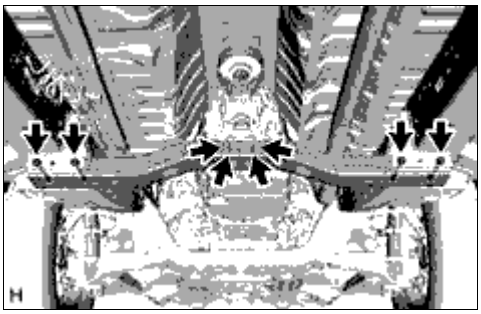
NOTICE:

- In order to protect the automatic transmission oil pan sub-assembly, place attachments on the transmission jack.
- Make sure that the attachments and the automatic transmission oil pan sub-assembly are centered on the transmission jack.
- To prevent the automatic transmission oil pan sub-assembly from deforming, do not place any attachments under the automatic transmission oil pan sub-assembly of the automatic transmission assembly.
- Secure the automatic transmission assembly to the transmission jack using a belt, etc. to prevent it from falling.



18. REMOVE NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

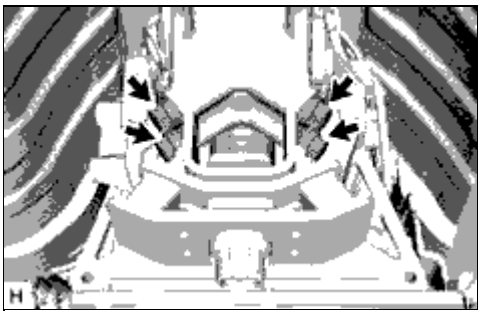
(a) Remove the 4 bolts and disconnect the No. 3 frame crossmember sub-assembly from the rear engine mounting insulator.



(b) Remove the 4 bolts, 4 nuts and No. 3 frame crossmember sub-assembly from the vehicle body.

19. REMOVE REAR ENGINE MOUNTING INSULATOR

(a) Remove the 4 bolts and rear engine mounting insulator from the automatic transmission assembly.



20. DISCONNECT BREATHER PLUG HOSE

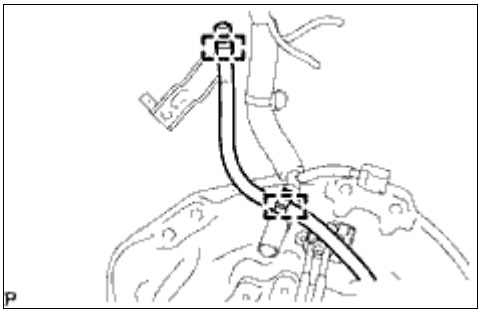
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(a) Tilt down the automatic transmission assembly.

NOTICE:

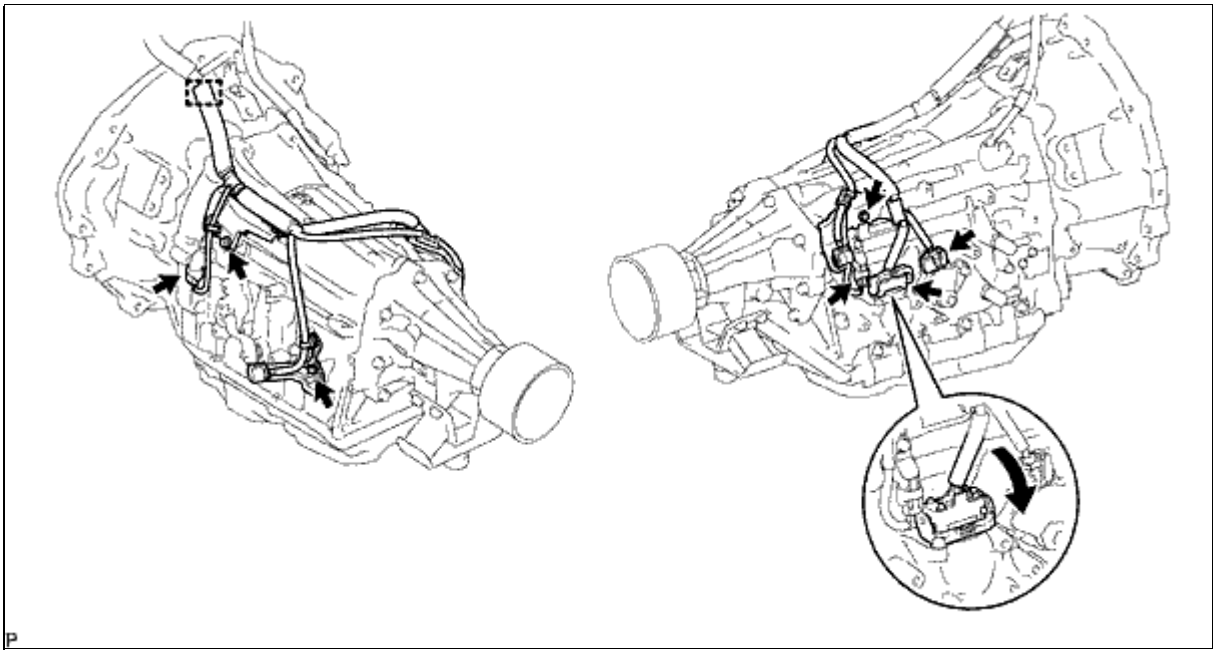
Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Detach the 2 clamps to disconnect the breather plug hose from the transmission breather bracket and wire harness.



21. DISCONNECT WIRE HARNESS

(a) Disconnect the park/neutral position switch connector, transmission wire connector and 2 transmission revolution sensor connectors.



HINT:

Detach the claw, press down the lever, and then disconnect the transmission wire connector.

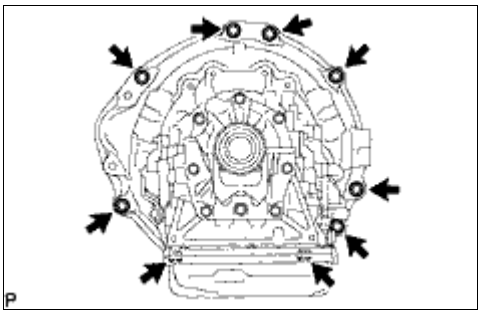
(b) Remove the 3 bolts to disconnect the 3 wire harness clamp brackets from the automatic transmission assembly.

(c) Detach the clamp to disconnect the wire harness from the automatic transmission assembly.

22. REMOVE AUTOMATIC TRANSMISSION ASSEMBLY

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(a) Remove the 9 bolts and automatic transmission assembly from the engine assembly.



NOTICE:

To prevent damage to the 2 knock pins, do not pry between the automatic transmission assembly and engine assembly.

23. REMOVE FLYWHEEL HOUSING UNDER COVER

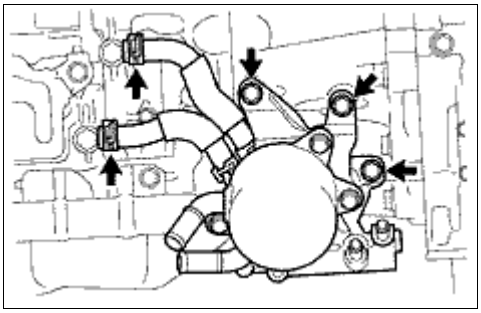
(a) Remove the flywheel housing under cover from the engine assembly.

24. REMOVE TRANSMISSION OIL COOLER ASSEMBLY

HINT:

It is not necessary to remove the transmission oil cooler assembly unless it is being replaced.

(a) Slide the 2 clips and disconnect the 2 oil cooler hoses from the automatic transmission assembly.



HINT:

Use a container to catch any ATF.

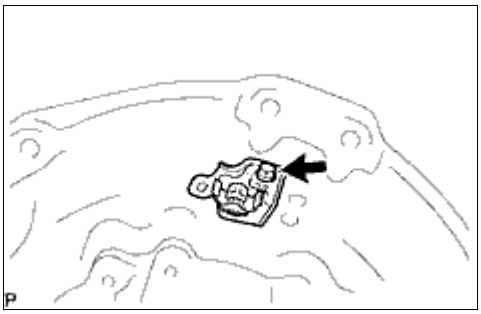
(b) Remove the 3 bolts and transmission oil cooler assembly with transmission oil thermostat from the automatic transmission assembly.

25. REMOVE TRANSMISSION BREATHER BRACKET

HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

(a) Remove the bolt and transmission breather bracket from the automatic transmission assembly.



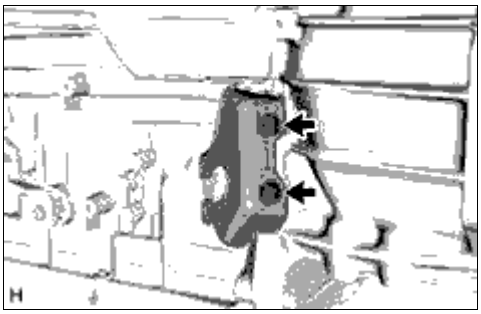
26. REMOVE TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

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(a) Remove the 2 bolts and transmission control cable bracket from the automatic transmission assembly.

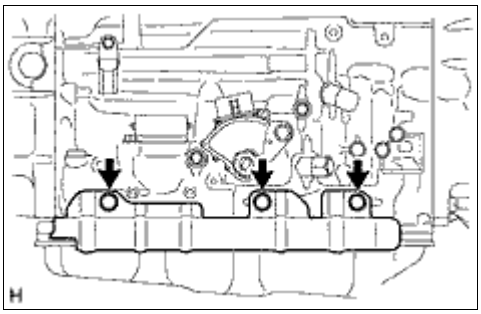


27. REMOVE TRANSMISSION OIL PAN HEAT INSULATOR

HINT:

It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

(a) Remove the 3 bolts and transmission oil pan heat insulator from the automatic transmission assembly.

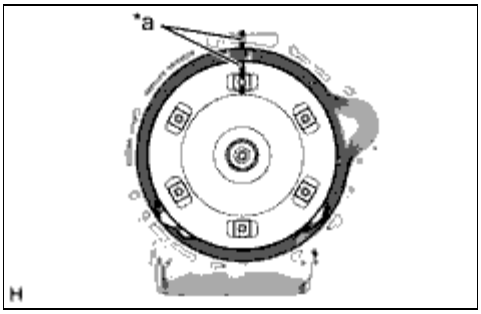


28. REMOVE TORQUE CONVERTER ASSEMBLY

(a) Put matchmarks on the automatic transmission assembly and torque converter assembly.

Text in Illustration

*a	Matchmark



(b) Remove the torque converter assembly from the automatic transmission assembly.

NOTICE:

Remove the torque converter assembly from the input shaft horizontally.

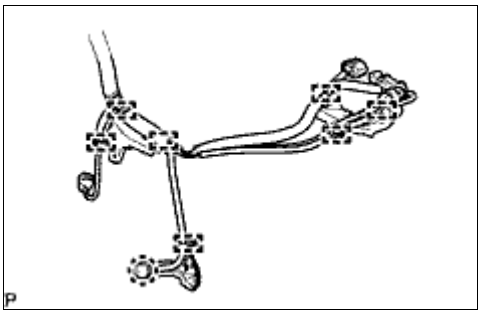
29. REMOVE WIRE HARNESS CLAMP BRACKET

HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.

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(a) Detach the 7 clamps and claw to remove the 3 wire harness clamp brackets from the wire harness.



30. INSPECT TORQUE CONVERTER ASSEMBLY INFO

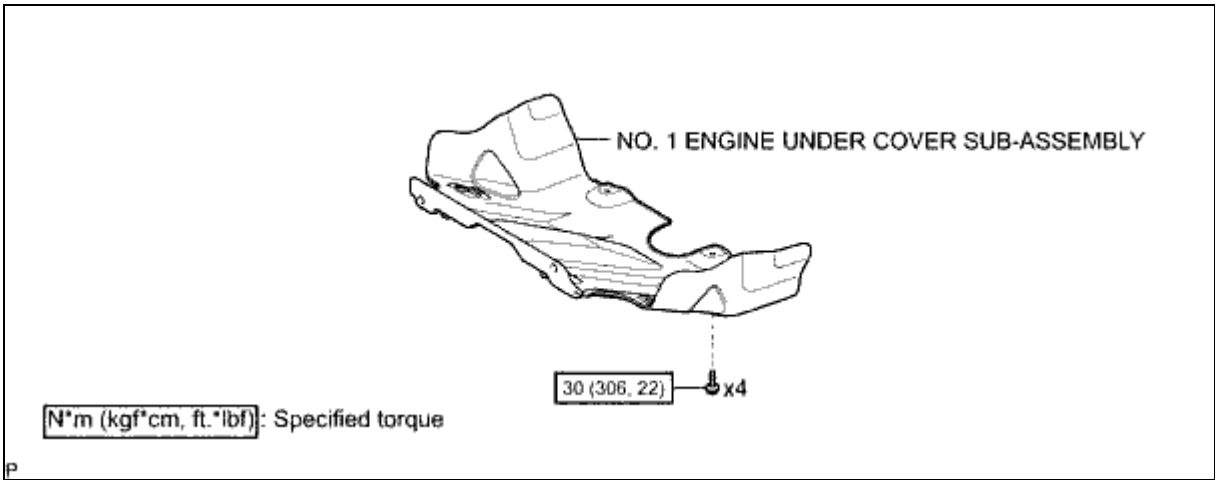
31. INSPECT DRIVE PLATE AND RING GEAR SUB-ASSEMBLY INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005LYC006X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2TR-FE): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

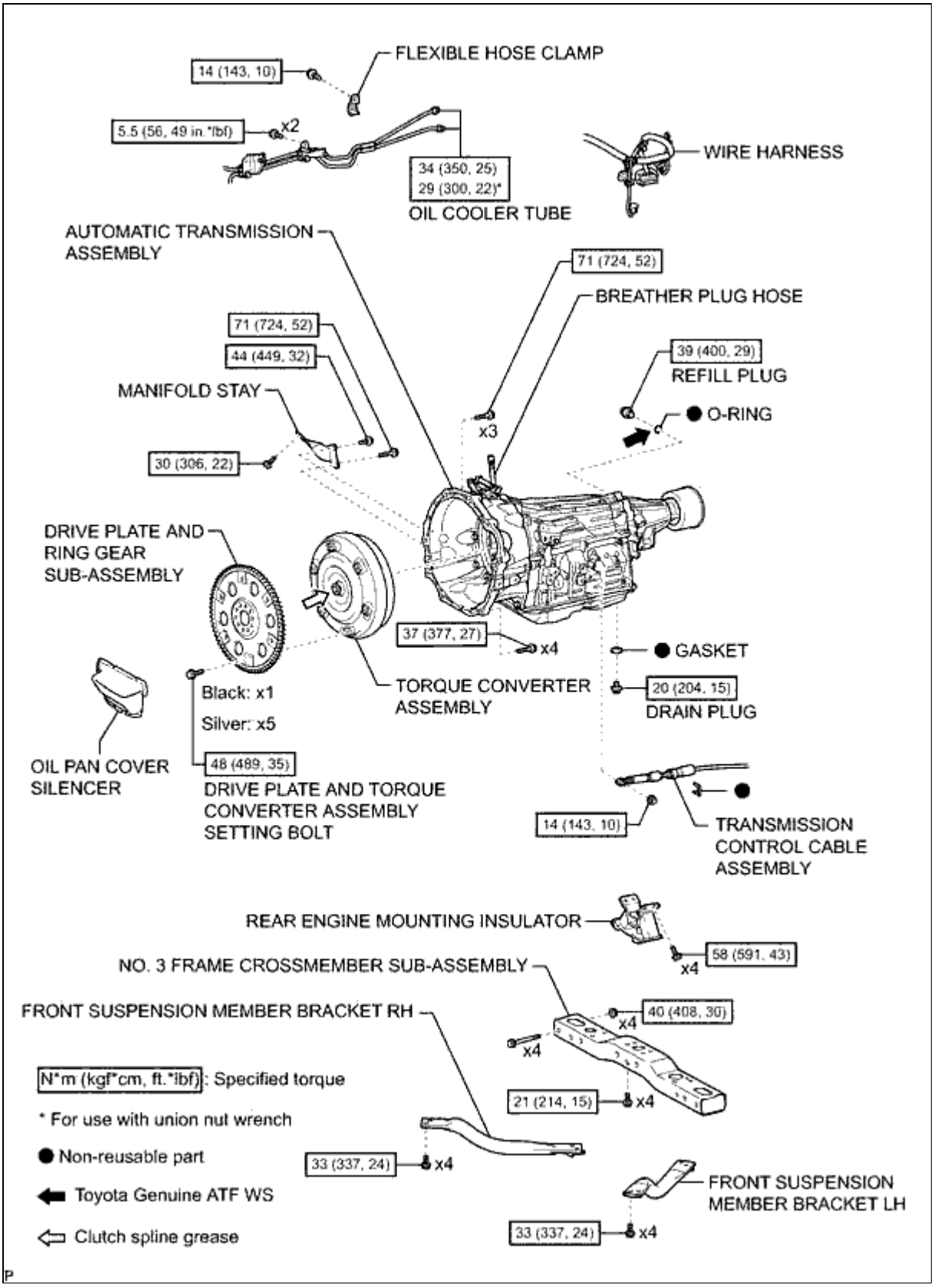
COMPONENTS

ILLUSTRATION



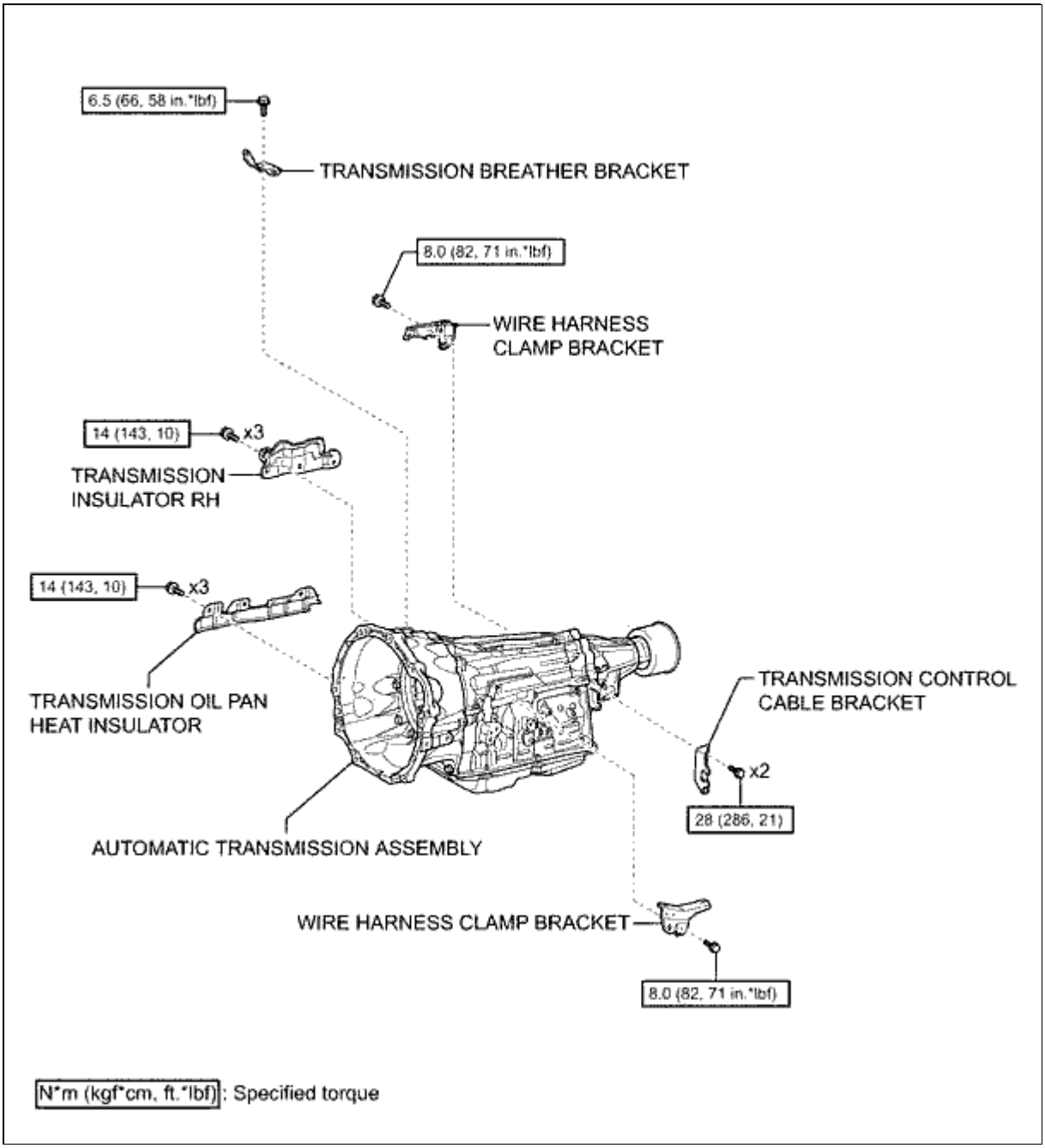
ILLUSTRATION

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ILLUSTRATION

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000NR805FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2TR-FE): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL WIRE HARNESS CLAMP BRACKET

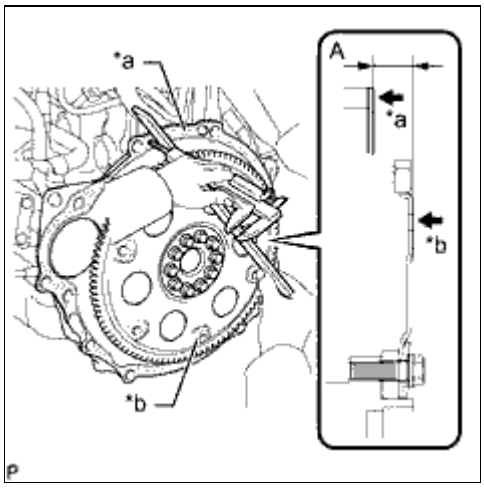
HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.

(a) Attach the 6 clamps to install the 2 wire harness clamp brackets to the wire harness.

2. INSTALL TORQUE CONVERTER ASSEMBLY

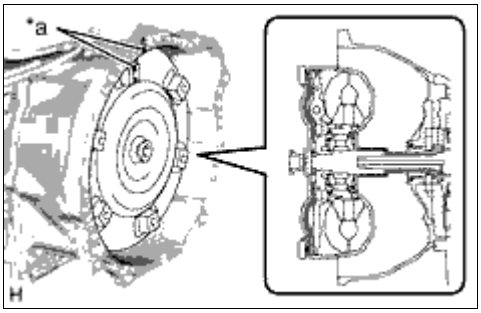
(a) Using a vernier caliper and straightedge, measure the dimension (A) between the automatic transmission assembly contact surface of the engine assembly (*a) and the torque converter assembly contact surface of the drive plate (*b).



Text in Illustration

*a	Engine Surface
*b	Drive Plate Surface

(b) Align the matchmark on the automatic transmission case sub-assembly with the one on the torque converter assembly and engage the splines of the input shaft with the turbine runner splines.



Text in Illustration

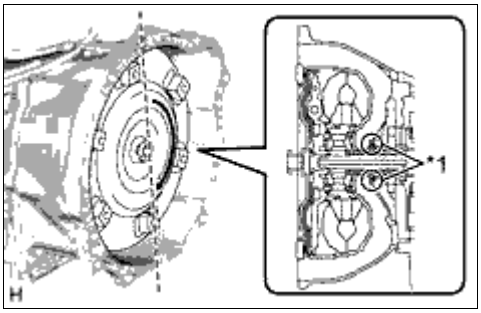
*a	Matchmark

NOTICE:

Install the torque converter assembly to the input shaft while keeping it horizontal.

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(c) Rotate the torque converter assembly approximately 180° and engage the splines of the stator shaft with the stator assembly.



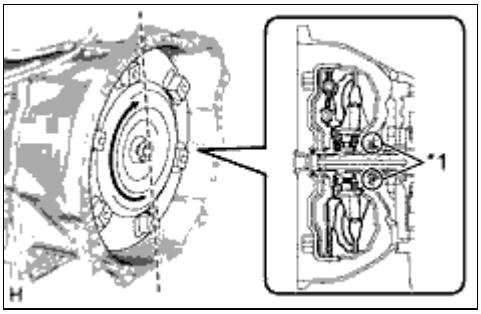
Text in Illustration

*1	Front Oil Pump Oil Seal

NOTICE:

- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(d) Rotate the torque converter assembly approximately 180° again, align the matchmark on the torque converter assembly with the one on the automatic transmission case sub-assembly and insert the key of the torque converter assembly into the groove of the oil pump drive gear.



Text in Illustration

*1	Front Oil Pump Oil Seal

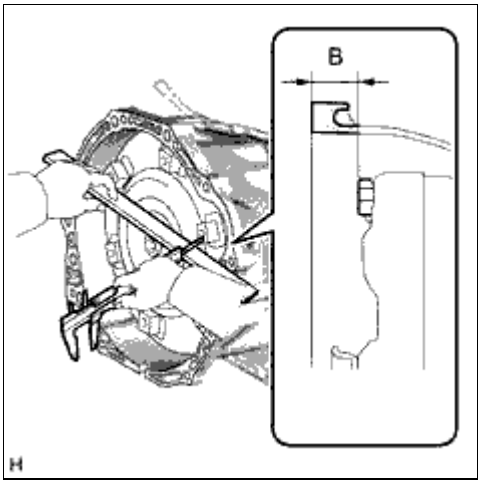
NOTICE:

- Do not push the torque converter assembly excessively when rotating it.
- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(e) Using a vernier caliper and straightedge, measure the dimension (B) shown in the illustration and check that the dimension (B) is more than the dimension (A), which was measured in the previous step.

Standard:

B = A + 1 mm (0.0394 in.) or more



NOTICE:

- Make sure to deduct the thickness of the straightedge.
- If the automatic transmission assembly is installed to the engine assembly with the torque converter assembly not sufficiently inserted, the torque converter assembly may be damaged.

3. INSTALL TRANSMISSION OIL PAN HEAT INSULATOR

HINT:

It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

(a) Install the transmission oil pan heat insulator to the automatic transmission assembly with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

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4. INSTALL TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

(a) Install the transmission control cable bracket to the automatic transmission assembly with the 2 bolts.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

5. INSTALL TRANSMISSION BREATHER BRACKET

HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

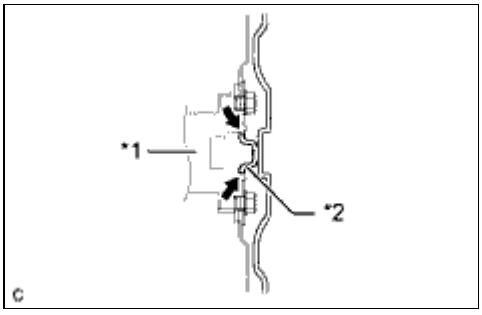
(a) Install the transmission breather bracket to the automatic transmission assembly with the bolt.

Torque:

6.5 N·m {66 kgf·cm, 58in·lbf}

6. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY

(a) Apply clutch spline grease to the circumference of the crankshaft that contacts the torque converter assembly centerpiece.



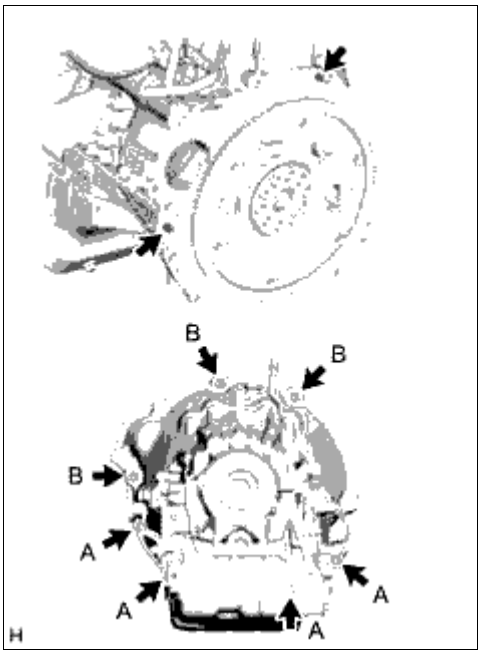
Text in Illustration

*1	Crankshaft
*2	Torque Converter Assembly Centerpiece
➡	Clutch Spline Grease

Clutch spline grease:
Toyota Genuine Clutch Spline Grease or equivalent
Maximum grease amount:
Approximately 1 g (0.0353 oz.)

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(b) Confirm that the 2 knock pins are installed on the engine assembly and are not damaged.



(c) While keeping the engine assembly and automatic transmission assembly horizontal, align the 2 knock pins with the holes in the automatic transmission assembly and install the 7 bolts.

Torque:

for Bolt A -

37 N·m {377 kgf·cm, 27ft·lbf}

for Bolt B -

71 N·m {724 kgf·cm, 52ft·lbf}

NOTICE:

- Do not use excessive force when installing the automatic transmission assembly.
- Check that the torque converter assembly rotates.
- Make sure that the wire harness or other similar items are not pinched between the contact surfaces.
- Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

7. INSTALL REAR ENGINE MOUNTING INSULATOR

(a) Install the rear engine mounting insulator to the automatic transmission assembly with the 4 bolts.

Torque:

58 N·m {591 kgf·cm, 43ft·lbf}

8. CONNECT WIRE HARNESS

(a) Tilt down the automatic transmission assembly.

NOTICE:

Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Attach the 3 clamps to connect the wire harness to the automatic transmission assembly and rear engine mounting insulator.

(c) Connect the 2 wire harness clamp brackets to the automatic transmission assembly with the 2 bolts.

Torque:

8.0 N·m {82 kgf·cm, 71in·lbf}

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(d) Connect the park/neutral position switch connector, transmission wire connector and 2 transmission revolution sensor connectors.

HINT:

Push up the lever until the claw of the transmission wire connector makes a connection sound.

9. CONNECT BREATHER PLUG HOSE

(a) Attach the 2 clamps to connect the breather plug hose to the transmission breather bracket and wire harness.

10. INSTALL NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

(a) Install the No. 3 frame crossmember sub-assembly to the vehicle body with the 4 bolts and 4 nuts.

Torque:

40 N·m {408 kgf·cm, 30ft·lbf}

NOTICE:

Install the nuts so that they face the rear of the vehicle.

HINT:

Hold the bolts while tightening the nuts.

(b) Connect the No. 3 frame crossmember sub-assembly to the rear engine mounting insulator with the 4 bolts.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

11. INSTALL FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Install the front suspension member bracket LH and front suspension member bracket RH to the No. 3 frame crossmember sub-assembly and vehicle body with the 8 bolts.

Torque:

33 N·m {337 kgf·cm, 24ft·lbf}

12. CONNECT OIL COOLER TUBE

(a) Connect the ends of the 2 oil cooler tubes to the automatic transmission assembly by hand.

(b) Connect the 2 oil cooler tubes to the engine assembly with the 2 bolts.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(c) Install the flexible hose clamp to the automatic transmission assembly with the bolt.

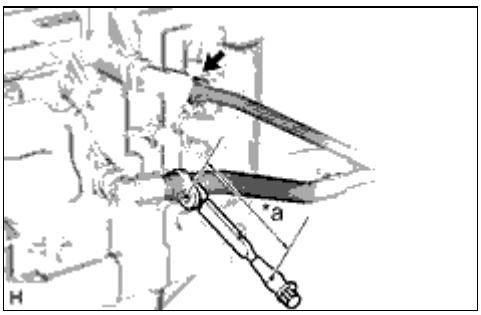
Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(d) Using a 17 mm union nut wrench, tighten the 2 oil cooler tubes.

Text in Illustration

*a	Torque Wrench Fulcrum Length



Torque:

Specified tightening torque -

34 N·m {350 kgf·cm, 25ft·lbf}

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HINT:

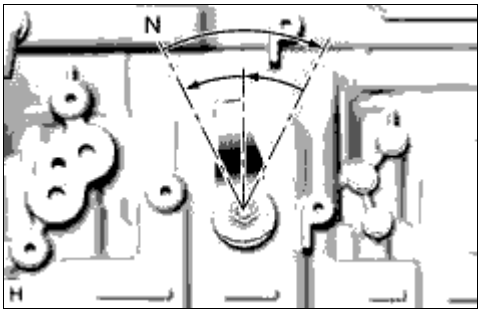
- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using a union nut wrench (fulcrum length of 30 mm (1.18 in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 29 N*m (300 kgf*cm, 22 ft.*lbf)

13. INSTALL TRANSMISSION INSULATOR RH INFO

14. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Move the shift lever to N.

(b) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(c) Connect the transmission control cable assembly to the transmission control shaft lever LH with the nut.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(d) Connect the transmission control cable assembly to the transmission control cable bracket with a new clip.

15. INSTALL MANIFOLD STAY

(a) Install the manifold stay to the automatic transmission assembly and exhaust manifold with the 3 bolts.

Torque:

for Bolt A -

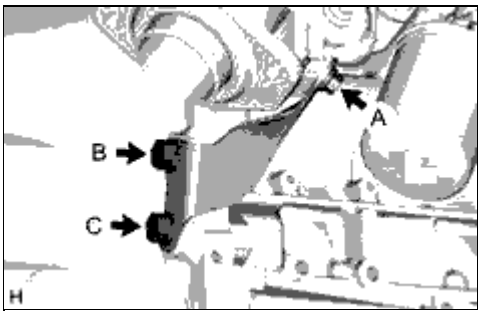
30 N·m {306 kgf·cm, 22ft·lbf}

for Bolt B -

44 N·m {449 kgf·cm, 32ft·lbf}

for Bolt C -

71 N·m {724 kgf·cm, 52ft·lbf}



16. INSTALL DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

(a) Turn the crankshaft to gain access to the installation locations of the 6 drive plate and torque converter assembly setting bolts and install each bolt while holding the crankshaft pulley bolt with a wrench.

Torque:

48 N·m {489 kgf·cm, 35ft·lbf}

NOTICE:

Install the black colored bolt first, and then the 5 silver colored bolts.

17. INSTALL OIL PAN COVER SILENCER

(a) Install the oil pan cover silencer to the engine assembly.

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18. INSTALL STARTER ASSEMBLY

INFO

19. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

20. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

21. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

22. ADD AUTOMATIC TRANSMISSION FLUID

INFO

23. INSPECT SHIFT LEVER POSITION INFO

24. INSPECT FOR OIL LEAK

(a) Start the engine. Make sure that there are no oil leaks from the areas that were worked on.

25. INSPECT FOR EXHAUST GAS LEAK INFO

26. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

27. RESET MEMORY

INFO

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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2TR-FE): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

CAUTION:

The automatic transmission assembly is very heavy. Be sure to follow the procedure described in the repair manual, or the transmission jack may suddenly drop.

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

3. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

4. DRAIN AUTOMATIC TRANSMISSION FLUID INFO

5. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

6. REMOVE FRONT EXHAUST PIPE ASSEMBLY

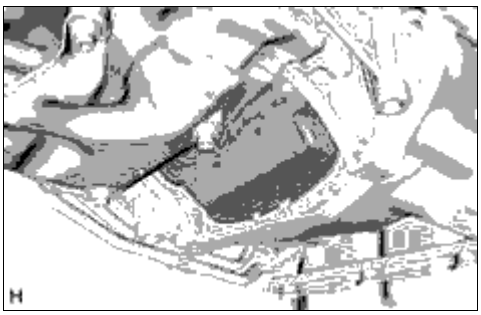
INFO

7. REMOVE STARTER ASSEMBLY

INFO

8. REMOVE OIL PAN COVER SILENCER

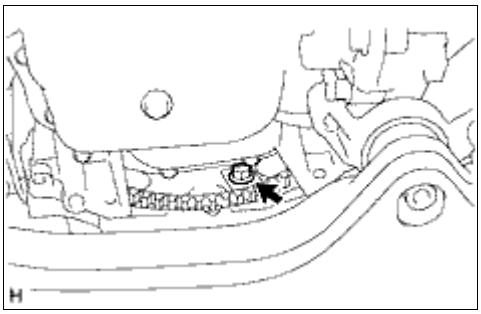
(a) Remove the oil pan cover silencer from the engine assembly.



9. REMOVE DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

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(a) Turn the crankshaft to gain access to the removable locations of the 6 drive plate and torque converter assembly setting bolts and remove each bolt while holding the crankshaft pulley bolt with a wrench.

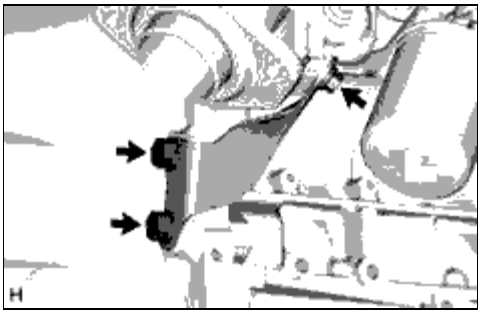


HINT:

There will be one black colored bolt.

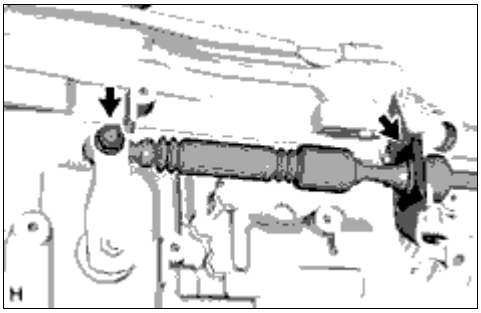
10. REMOVE MANIFOLD STAY

(a) Remove the 3 bolts and manifold stay from the automatic transmission assembly and exhaust manifold.



11. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

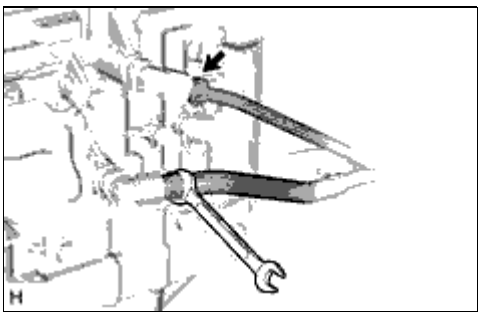
(a) Remove the clip and nut and disconnect the transmission control cable assembly from the transmission control shaft lever LH and transmission control cable bracket.



12. REMOVE TRANSMISSION INSULATOR RH INFO

13. DISCONNECT OIL COOLER TUBE

(a) Disconnect the 2 oil cooler tubes from the automatic transmission assembly.

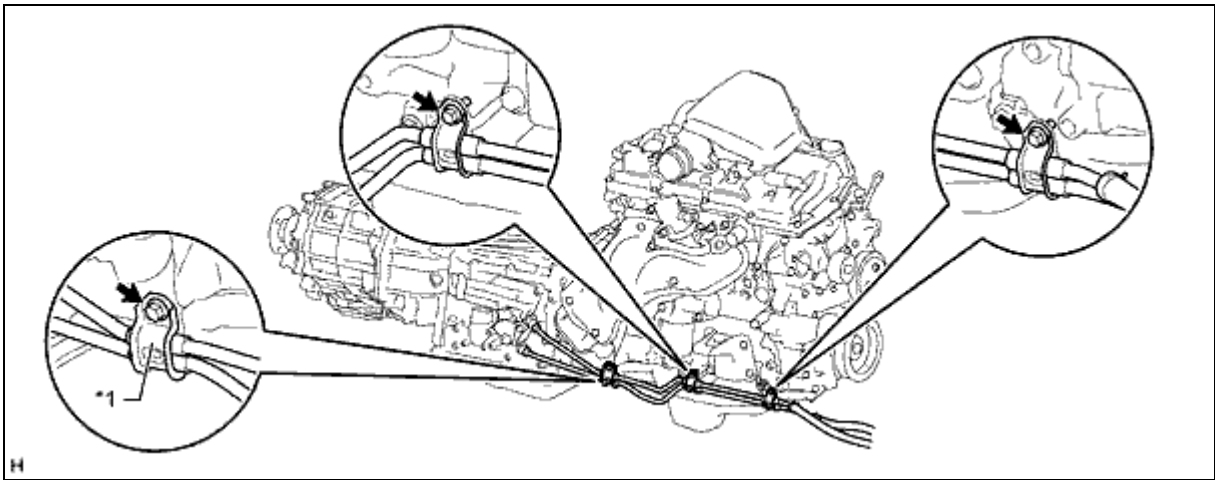


HINT:

Use a container to catch any ATF.

(b) Remove the bolt and flexible hose clamp from the automatic transmission assembly.

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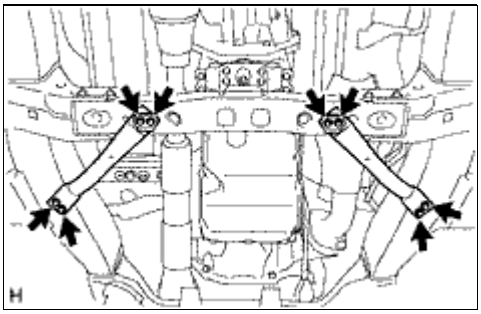
Text in Illustration

*1	Flexible Hose Clamp	-	-

(c) Remove the 2 bolts and disconnect the 2 oil cooler tubes from the engine assembly.

14. REMOVE FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Remove the 8 bolts, front suspension member bracket LH and front suspension member bracket RH from the No. 3 frame crossmember sub-assembly and vehicle body.

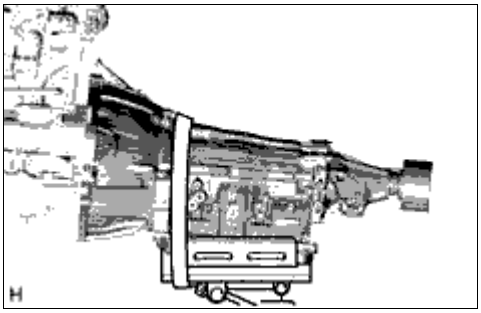


15. SUPPORT AUTOMATIC TRANSMISSION ASSEMBLY

(a) Support the automatic transmission assembly with a transmission jack.

NOTICE:

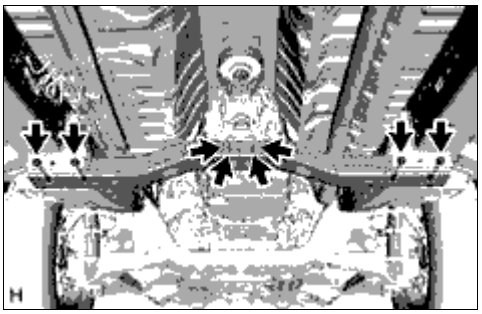
- In order to protect the automatic transmission oil pan sub-assembly, place attachments on the transmission jack.
- Make sure that the attachments and the automatic transmission oil pan sub-assembly are centered on the transmission jack.
- To prevent the automatic transmission oil pan sub-assembly from deforming, do not place any attachments under the automatic transmission oil pan sub-assembly of the automatic transmission assembly.
- Secure the automatic transmission assembly to the transmission jack using a belt, etc. to prevent it from falling.



16. REMOVE NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

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(a) Remove the 4 bolts and disconnect the No. 3 frame crossmember sub-assembly from the rear engine mounting insulator.



(b) Remove the 4 bolts, 4 nuts and No. 3 frame crossmember sub-assembly from the vehicle body.

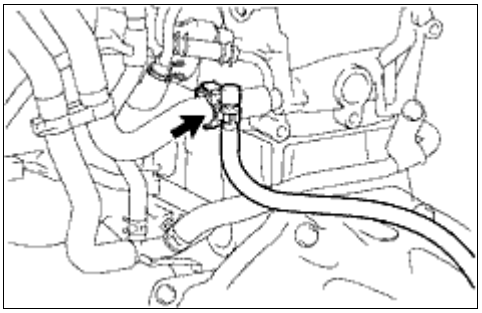
17. DISCONNECT BREATHER PLUG HOSE

(a) Tilt down the automatic transmission assembly.

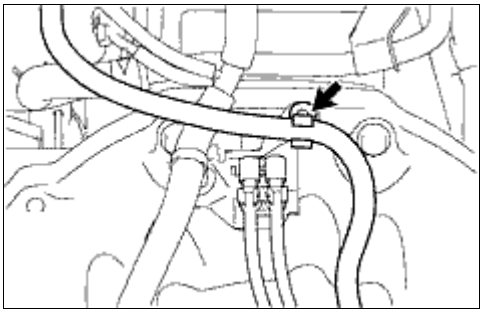
NOTICE:

Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Detach the clamp to disconnect the breather plug hose from the engine assembly.



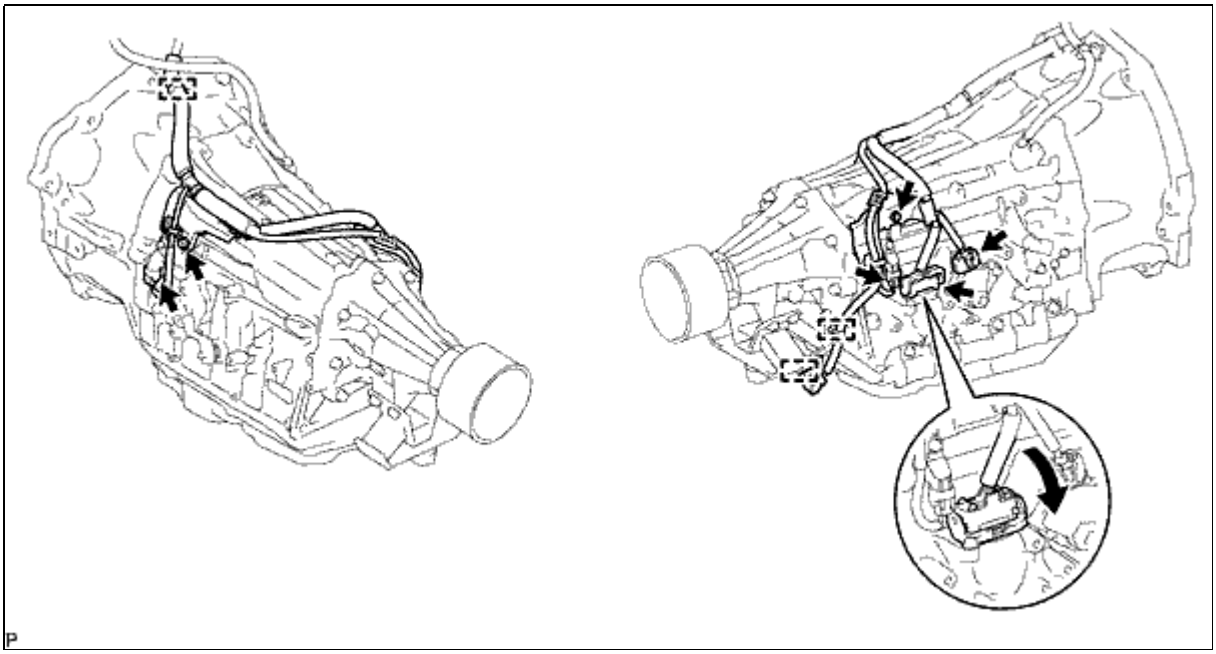
(c) Detach the clamp to disconnect the breather plug hose from the transmission breather bracket.



18. DISCONNECT WIRE HARNESS

(a) Disconnect the park/neutral position switch connector, transmission wire connector and 2 transmission revolution sensor connectors.

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HINT:

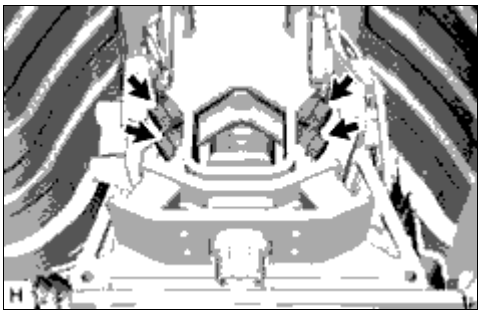
Detach the claw, press down the lever, and then disconnect the transmission wire connector.

(b) Remove the 2 bolts to disconnect the 2 wire harness clamp brackets from the automatic transmission assembly.

(c) Detach the 3 clamps to disconnect the wire harness from the automatic transmission assembly and rear engine mounting insulator.

19. REMOVE REAR ENGINE MOUNTING INSULATOR

(a) Remove the 4 bolts and rear engine mounting insulator from the automatic transmission assembly.

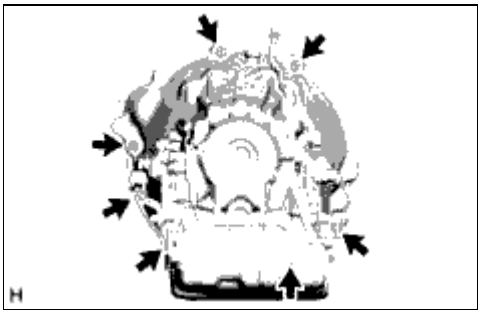


20. REMOVE AUTOMATIC TRANSMISSION ASSEMBLY

(a) Remove the 7 bolts and automatic transmission assembly from the engine assembly.

NOTICE:

To prevent damage to the 2 knock pins, do not pry between the automatic transmission assembly and engine assembly.



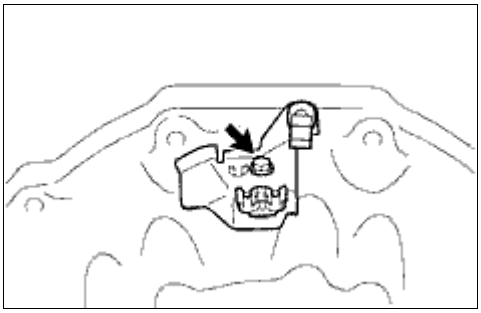
21. REMOVE TRANSMISSION BREATHER BRACKET

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HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

(a) Remove the bolt and disconnect the transmission breather bracket from the automatic transmission assembly.



22. REMOVE TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

(a) Remove the 2 bolts and transmission control cable bracket from the automatic transmission assembly.

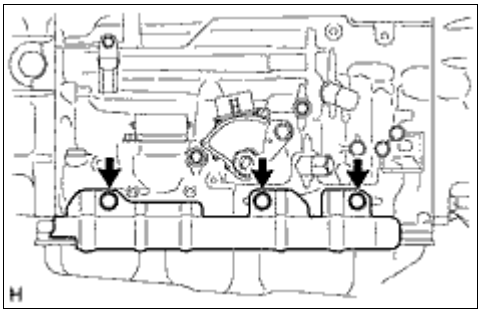


23. REMOVE TRANSMISSION OIL PAN HEAT INSULATOR

HINT:

It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

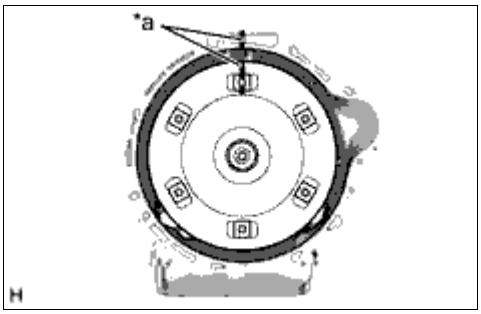
(a) Remove the 3 bolts and transmission oil pan heat insulator from the automatic transmission assembly.



24. REMOVE TORQUE CONVERTER ASSEMBLY

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(a) Put matchmarks on the automatic transmission assembly and the torque converter assembly.



Text in Illustration

*a	Matchmark

(b) Remove the torque converter assembly from the automatic transmission assembly.

NOTICE:

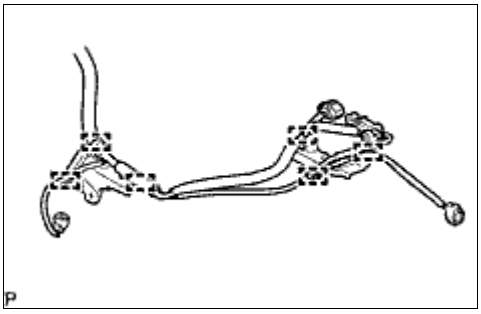
Remove the torque converter assembly from the input shaft horizontally.

25. REMOVE WIRE HARNESS CLAMP BRACKET

HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.

(a) Detach the 6 clamps to remove the 2 wire harness clamp brackets from the wire harness.



26. INSPECT TORQUE CONVERTER ASSEMBLY INFO

27. INSPECT DRIVE PLATE AND RING GEAR SUB-ASSEMBLY INFO

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Last Modified: 2-12-2016	6.6 N	**Doc ID:** RM0000013BU0DOX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION FLUID: ADJUSTMENT; 2016 MY Tacoma [08/2015 -]		

ADJUSTMENT

1. BEFORE FILLING TRANSMISSION

- The AC60E automatic transmission assembly requires Toyota Genuine ATF WS.
- If the entire automatic transmission assembly, automatic transmission oil pan sub-assembly, drain plug, transmission valve body assembly and/or torque converter assembly have/has been replaced, proceed to the Fill Transmission procedure.
- If the extension housing rear oil seal has been replaced and/or an automatic transmission fluid leak has been repaired, proceed to the Adjust Fluid Temperature procedure.

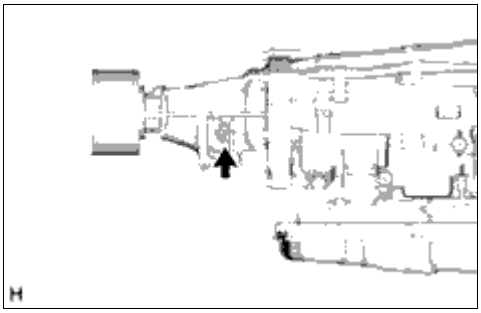
2. FILL TRANSMISSION PAN WITH FLUID

(a) Lift the vehicle.

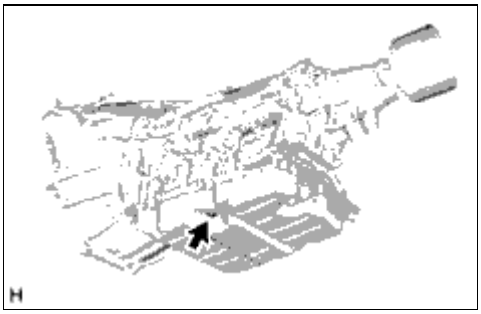
NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within +/-1°).

(b) Remove the refill plug and O-ring from the automatic transmission assembly.

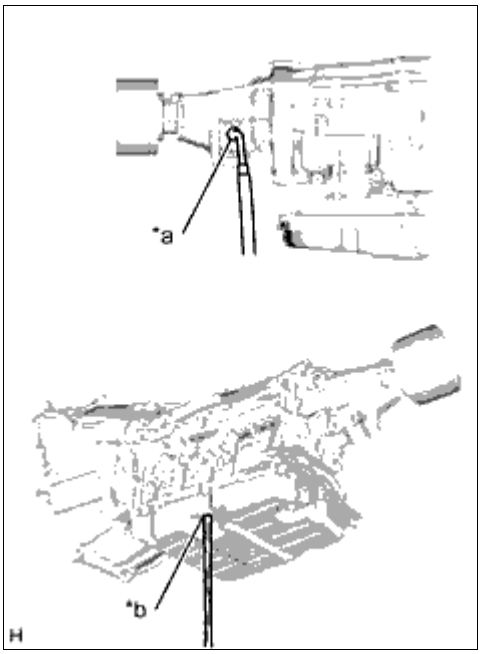


(c) Using a 5 mm hexagon socket wrench, remove the overflow plug and gasket from the automatic transmission assembly.



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(d) Add automatic transmission fluid to the refill hole until it flows out of the overflow hole.



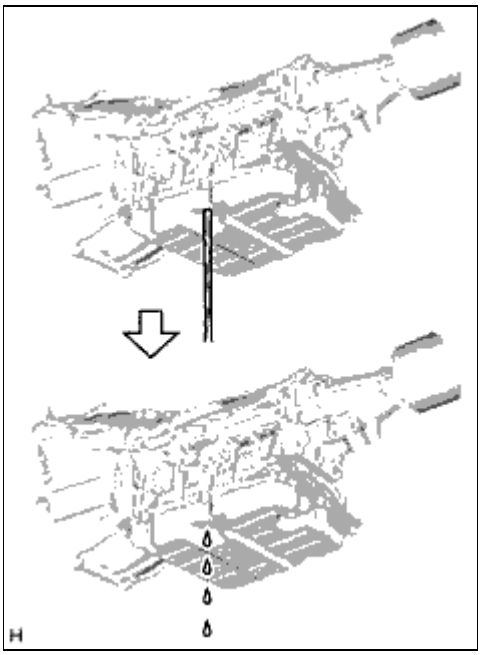
Text in Illustration

*a	Refill Hole
*b	Overflow Hole

NOTICE:

- Use Toyota Genuine ATF WS.
- Be sure to add automatic transmission fluid slowly. If automatic transmission fluid is added quickly, the automatic transmission fluid may hit internal parts and bounce back, resulting in automatic transmission fluid coming out of the refill hole.

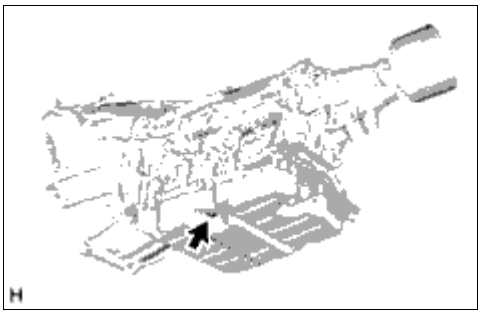
(e) Wait until the automatic transmission fluid flow slows and only drips come out.



(f) Using a 5 mm hexagon socket wrench, temporarily install the overflow plug and gasket to the automatic transmission assembly.

HINT:

Reuse the old gasket as the overflow plug will be removed again.



3. FILL TRANSMISSION

(a) Fill the transmission with the correct amount of fluid as listed in the table below.

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Standard Capacity:

PERFORMED REPAIR	ENGINE TYPE	FILL AMOUNT
Automatic transmission fluid drain and refill	2GR-FKS	3.1 liters (3.3 US qts, 2.7 Imp. qts)
	2TR-FE	1.5 liters (1.6 US qts, 1.3 Imp. qts)
Removal and installation of the automatic transmission oil pan sub-assembly	2GR-FKS	2.4 liters (2.5 US qts, 2.1 Imp. qts)
	2TR-FE	0.8 liters (0.8 US qts, 0.7 Imp. qts)
Removal and installation of the transmission valve body assembly	2GR-FKS	3.1 liters (3.3 US qts, 2.7 Imp. qts)
	2TR-FE	1.6 liters (1.7 US qts, 1.4 Imp. qts)
Removal and installation of the torque converter assembly (Including the oil drain)	2GR-FKS	4.2 liters (4.4 US qts, 3.7 Imp. qts)
	2TR-FE	2.4 liters (2.5 US qts, 2.1 Imp. qts)

HINT:

If the specified amount of automatic transmission fluid cannot be added, perform the following:

(1) Temporarily install the O-ring and refill plug to the automatic transmission assembly.

HINT:

Reuse the old O-ring as the refill plug will be removed again.

(2) Lower the vehicle.

(3) Start the engine.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

(4) Slowly move the shift lever from P to S, then move the shift lever to P.

(5) Allow the engine to idle for 30 seconds to warm it up.

(6) Turn the ignition switch off.

(7) Remove the refill plug and O-ring from the automatic transmission assembly.

(8) Fill the automatic transmission assembly with the correct amount of automatic transmission fluid as listed in the table above.

(9) Temporarily install the O-ring and refill plug to the automatic transmission assembly.

HINT:

Reuse the old O-ring as the refill plug will be removed again.

4. CHECK FLUID TEMPERATURE

NOTICE:

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The automatic transmission fluid temperature can be confirmed by checking the D shift indicator on the combination meter or using the Techstream. When not using the Techstream, it is necessary to enter automatic transmission fluid temperature detection mode.

(a) When using the Techstream:

HINT:

The actual ATF temperature can be checked on the Data List using the Techstream.

(1) Connect the Techstream to the DLC3 with the ignition switch off.

(2) Turn the ignition switch to ON and turn the Techstream on.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system are off.

(3) for 2GR-FKS:

Enter the following menus: Powertrain / Transmission / Active Test / Connect the TC and TE1.

(4) for 2TR-FE:

Enter the following menus: Powertrain / Engine and ECT / Active Test / Connect the TC and TE1.

(5) Select the Active Test item: Connect the TC and TE1 / ON.

(6) Select the Data List menu: A/T Oil Temperature 1.

(7) Check the ATF temperature.

NOTICE:

- If the fluid temperature is below 45°C (113°F), proceed to the next step. (Recommended ATF temperature: 35°C (95°F) or less)
- If the fluid temperature is 45°C (113°F) or more, turn the ignition switch off and wait until the fluid temperature drops below 45°C (113°F).

(8) Depress and hold the brake pedal.

(9) Start the engine.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

(10) Slowly move the shift lever from P to S, then move the shift lever to P.

HINT:

Slowly move the shift lever to circulate the automatic transmission fluid through each part of the automatic transmission assembly.

(11) While observing the D shift indicator on the combination meter, move the shift lever back and forth between N and D at an interval of less than 1.5 seconds for 6 seconds or more.

NOTICE:

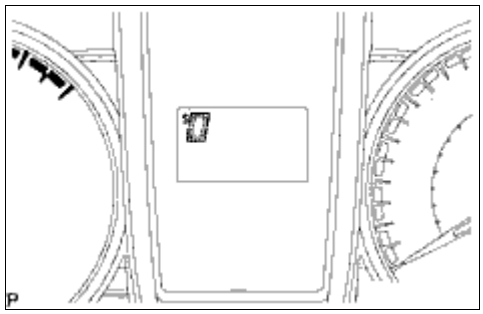
Do not pause for more than 1.5 seconds.

HINT:

Performing this operation will cause the vehicle to enter automatic transmission fluid temperature detection mode.

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(12) Check that the D shift indicator comes on for 2 seconds.



HINT:

- When fluid temperature detection mode is activated, the D shift indicator on the combination meter comes on for 2 seconds.
- If the D shift indicator does not come on for 2 seconds, return to the first step and perform the procedure again.

(13) Move the shift lever from N to P.

(14) Release the brake pedal.

(15) Select the Active Test item: Connect the TC and TE1 / OFF.

NOTICE:

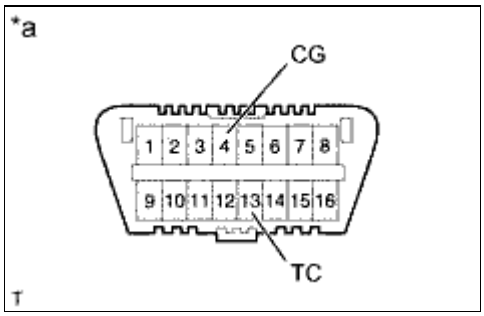
Be sure that terminals TC and TE1 are not connected. If the terminals are connected, the fluid level cannot be precisely adjusted due to fluctuations in engine speed.

HINT:

- Disconnecting terminals TC and TE1 activates engine idle speed control mode.
- Even after terminals TC and TE1 are disconnected, automatic transmission fluid temperature detection mode will be active until the ignition switch is turned off.

(b) When not using the Techstream:

(1) Connect terminals CG (4) and TC (13) of the DLC3 using SST.



Text in Illustration

*a	DLC3

SST: 09843-18040

(2) Depress and hold the brake pedal.

(3) Start the engine.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fans and audio system, are off.

HINT:

The indicator lights on the combination meter blink to indicate DTCs when terminals TC and CG are connected.

(4) Slowly move the shift lever from P to S, then move the shift lever to P.

HINT:

Slowly move the shift lever to circulate the automatic transmission fluid through each part of the automatic transmission assembly.

(5) While observing the D shift indicator on the combination meter, move the shift lever back and forth between N and D at an interval of less than 1.5 seconds for 6 seconds or more.

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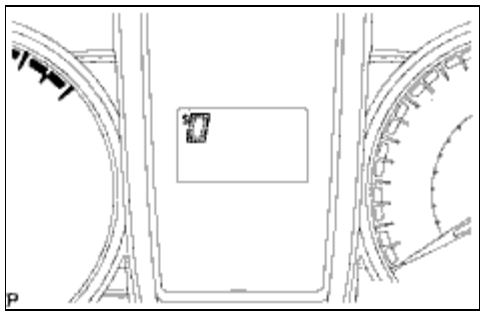
NOTICE:

Do not pause for more than 1.5 seconds.

HINT:

Performing this operation will cause the vehicle to enter automatic transmission fluid temperature detection mode.

(6) Check that the D shift indicator comes on for 2 seconds.



HINT:

- When fluid temperature detection mode is activated, the D shift indicator on the combination meter comes on for 2 seconds.
- If the D shift indicator does not come on for 2 seconds, return to the first step and perform the procedure again.

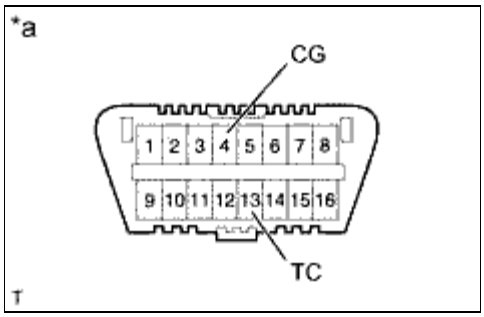
(7) Move the shift lever from N to P.

(8) Release the brake pedal.

(9) Remove SST from terminals 13 (TC) and 4 (CG).

Text in Illustration

*a	DLC3



SST: 09843-18040

NOTICE:

Be sure that terminals TC and CG are not connected. If the terminals are connected, the automatic transmission fluid level cannot be precisely adjusted due to fluctuations in engine speed.

HINT:

- Disconnecting terminals TC and CG activates the engine idle speed control mode.
- Even after terminals TC and CG are disconnected, automatic transmission fluid temperature detection mode will be active until the ignition switch is turned off.

(c) Allow the engine to idle until the automatic transmission fluid temperature reaches 35 to 45°C (95 to 113°F).

(d) The D shift indicator will come on again when the fluid temperature reaches 35°C (95°F) and will blink when it exceeds 45°C (113°F).

HINT:

Adjust the transmission fluid level when the "D" shift indicator is illuminated.

1. If the D shift indicator is not illuminated, idle the engine to warm it up until the D shift indicator illuminates.
2. If the D shift indicator is illuminated, immediately begin to adjust the automatic transmission fluid level.
3. If the D shift indicator is blinking, stop the engine to cool the automatic transmission fluid. Once the automatic transmission fluid temperature drops to the appropriate level, perform the

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automatic transmission fluid level adjustment procedure again.

D Shift Indicator:

BELOW AUTOMATIC TRANSMISSION FLUID LEVEL ADJUSTMENT (35°C OR LESS) (95°F OR LESS)	AUTOMATIC TRANSMISSION FLUID LEVEL ADJUSTMENT TEMPERATURE (35 TO 45°C) (95 TO 113°F)	ABOVE AUTOMATIC TRANSMISSION FLUID LEVEL ADJUSTMENT TEMPERATURE (45°C OR MORE) (113°F OR MORE)
OFF	ON	Blinks

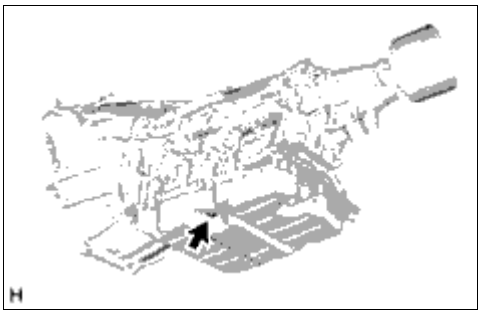
5. CHECK FLUID LEVEL

(a) Lift the vehicle.

NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within +/-1°).

(b) Using a 5 mm hexagon socket wrench, remove the overflow plug and gasket from the automatic transmission assembly.



CAUTION:

Be careful as the automatic transmission fluid coming out of the overflow hole is hot.

(c) Check the amount of automatic transmission fluid that comes out of the overflow hole.

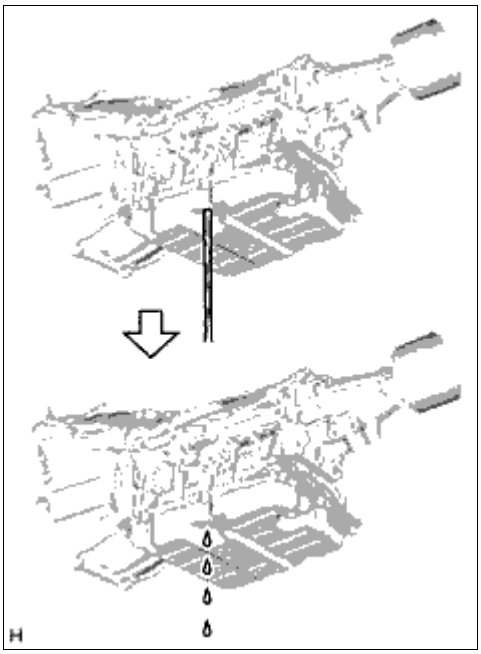
- If the amount of automatic transmission fluid that comes out of the overflow hole is large, proceed to step [*1].
- If no automatic transmission fluid comes out of the overflow hole, proceed to step [*2].

NOTICE:

If only a small amount of automatic transmission fluid (approximately 5 cc) comes out of the overflow hole, then only automatic transmission fluid remaining in the overflow tube of overflow hole has come out. This is not considered to be overflow.

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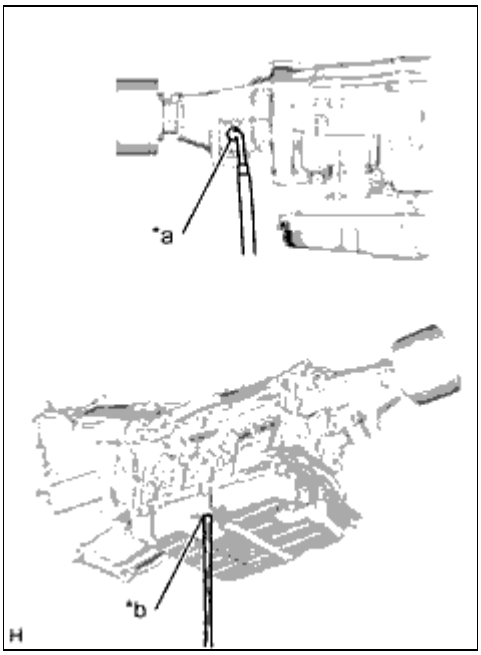
(d) If the amount of automatic transmission fluid that comes out of the overflow hole is large, wait until the automatic transmission fluid flow slows and only drips come out. [*1]



HINT:

The automatic transmission fluid flow will not stop completely because the automatic transmission fluid continues to expand as its temperature increases.

(e) If no automatic transmission fluid comes out of the overflow hole, remove the refill plug and O-ring. Then add automatic transmission fluid to the refill hole until it flows out of the overflow hole. Wait until the automatic transmission fluid flow slows and only drips come out. [*2]



Text in Illustration

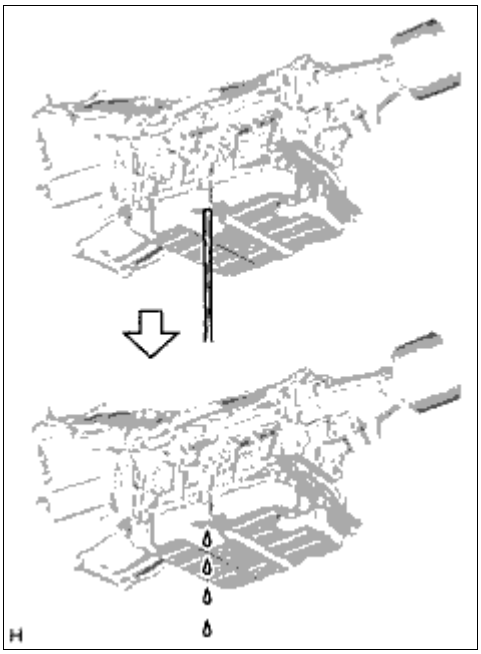
*a	Refill Hole
*b	Overflow Hole

NOTICE:

- Use Toyota Genuine ATF WS.
- Be sure to add automatic transmission fluid slowly. If automatic transmission fluid is added quickly, the automatic transmission fluid may hit internal parts and bounce back, resulting in automatic transmission fluid coming out of the refill hole.

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(f) Wait until the automatic transmission fluid flow slows and only drips come out.



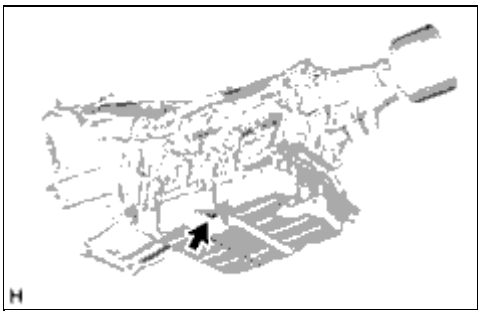
HINT:

The automatic transmission fluid flow will not stop completely because the automatic transmission fluid continues to expand as its temperature increases.

(g) Using a 5 mm hexagon socket wrench, install a new gasket and the overflow plug to the automatic transmission assembly.

Torque:

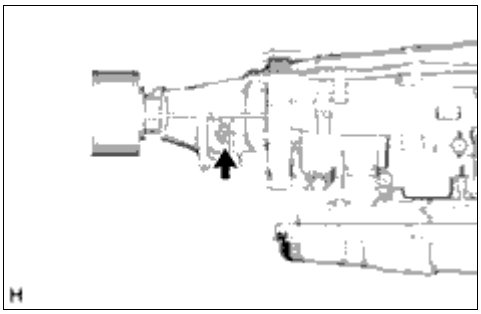
20 N·m {204 kgf·cm, 15ft·lbf}



(h) Install a new O-ring and the refill plug to the automatic transmission assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



(i) Lower the vehicle.

(j) Turn the ignition switch off.

HINT:

Turning the ignition switch off exits automatic transmission fluid temperature detection mode.

(k) Disconnect the Techstream from the DLC3 (when using the Techstream).

6. AFTER FILLING TRANSMISSION

(a) Lift the vehicle.

(b) Clean each part.

(c) Check for automatic transmission fluid leaks.

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(d) Lower the vehicle.

7. ATF THERMAL DEGRADATION ESTIMATE RESET

HINT:

Approximately 50% or more of the automatic transmission fluid has been replaced during a repair of the transmission or a similar operation INFO .

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Last Modified: 2-12-2016	6.6 A	**Doc ID:** RM000004LXE00UX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION FLUID: REPLACEMENT; 2016 MY Tacoma [08/2015 -]		

REPLACEMENT

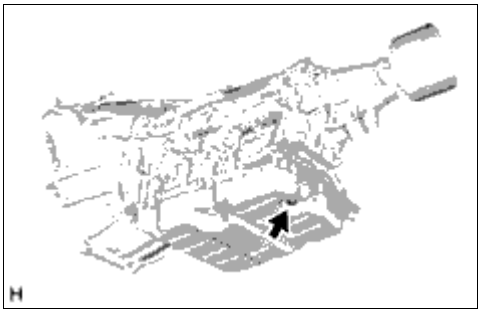
1. REPLACE AUTOMATIC TRANSMISSION FLUID

(a) Lift the vehicle. [*1]

NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within +/-1°).

(b) Remove the drain plug and gasket from the automatic transmission assembly and drain the automatic transmission fluid. [*2]

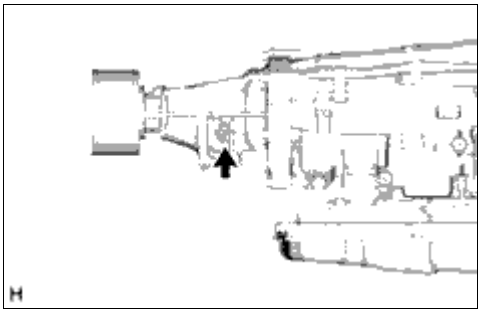


(c) Temporarily install the gasket and drain plug to the automatic transmission assembly. [*3]

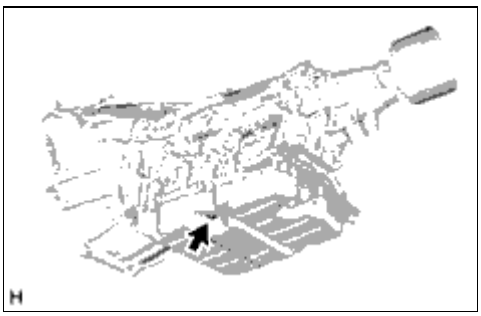
HINT:

Reuse the old gasket as the drain plug will be removed again.

(d) Remove the refill plug and O-ring from the automatic transmission assembly. [*4]

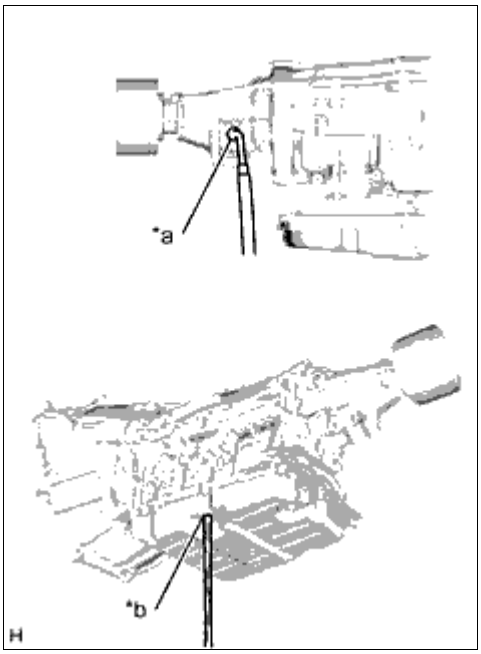


(e) Using a 5 mm hexagon socket wrench, remove the overflow plug and gasket from the automatic transmission assembly. [*5]



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(f) Add automatic transmission fluid to the refill hole until it flows out of the overflow hole. [*6]



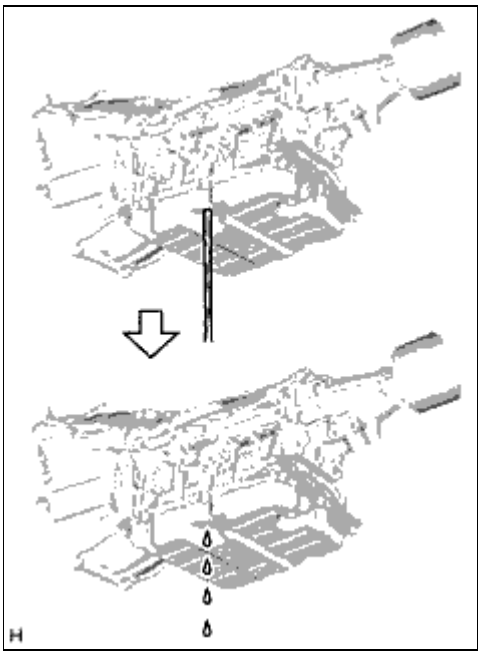
Text in Illustration

*a	Refill Hole
*b	Overflow Hole

NOTICE:

- Use Toyota Genuine ATF WS.
- Be sure to add automatic transmission fluid slowly. If automatic transmission fluid is added quickly, the automatic transmission fluid may hit internal parts and bounce back, resulting in automatic transmission fluid coming out of the refill hole.

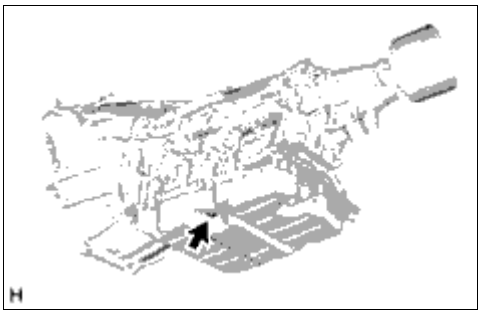
(g) Wait until the automatic transmission fluid flow slows and only drips come out. [*7]



(h) Using a 5 mm hexagon socket wrench, temporarily install the gasket and overflow plug to the automatic transmission assembly. [*8]

HINT:

Reuse the old gasket as the overflow plug will be removed again.



(i) Add the amount of automatic transmission fluid specified for removal and installation of the automatic transmission oil pan sub-assembly to the refill hole. [*9]

Specified amount of fluid:

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for 2GR-FKS

3.1 liters (3.3 US qts, 2.7 Imp. qts)

for 2TR-FE

1.5 liters (1.6 US qts, 1.3 Imp. qts)

HINT:

If the specified amount of automatic transmission fluid cannot be added, perform steps [*10] to [*15].

(j) Temporarily install the O-ring and refill plug to the automatic transmission assembly. [*10]

HINT:

Reuse the old O-ring as the refill plug will be removed again.

(k) Lower the vehicle. [*11]

(l) Start the engine. [*12]

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

(m) Slowly move the shift lever from P to S, and then back to P. [*13]

(n) Allow the engine to idle for 30 seconds to warm it up. [*14]

(o) Turn the ignition switch off. [*15]

(p) Repeat steps [*1] to [*15].

(q) Repeat steps [*1] to [*2].

(r) Install a new gasket and the drain plug to the automatic transmission assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

(s) Repeat steps [*4] to [*11].

2. CHECK FLUID TEMPERATURE INFO

3. CHECK FLUID LEVEL INFO

4. AFTER FILLING TRANSMISSION INFO

5. ATF THERMAL DEGRADATION ESTIMATE RESET (for 2TR-FE)

HINT:

Approximately 50% or more of the automatic transmission fluid has been replaced during a repair of the transmission or a similar operation INFO .

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W780XJX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): CHECK MODE PROCEDURE; 2016 MY Tacoma [08/2015 -]		

CHECK MODE PROCEDURE

1. DESCRIPTION

(a) Check mode has a higher sensitivity to malfunctions and can detect malfunctions that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect. In check mode, DTCs are detected with 1 trip detection logic.

2. CHECK MODE PROCEDURE

(a) Make sure that the following conditions are met:

(1) Battery positive voltage 11 V or higher.

(2) Throttle valve fully closed.

(3) Shift lever in P or N.

(4) Air conditioning off.

(b) Turn the ignition switch off.

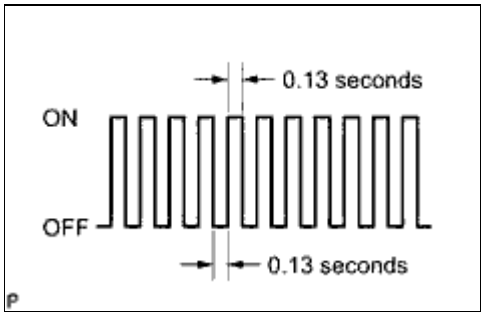
(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Utility / Check Mode.

(g) Change the ECM to check mode. Make sure the MIL flashes as shown in the illustration.



NOTICE:

All DTCs and freeze frame data will be cleared if: 1) the Techstream is used to change the ECM from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or off.

Before entering check mode, make notes of the DTCs and freeze frame data.

(h) Start the engine. The MIL should turn off after the engine starts.

(i) Perform Monitor Drive Pattern for the ECT test INFO .

(Or, simulate the conditions of the malfunction described by the customer.)

(j) After simulating the malfunction conditions, use the Techstream to check the DTC and freeze frame data.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7E103X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DATA LIST / ACTIVE TEST; 2016 MY Tacoma [08/2015 -]		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	• This is the current vehicle speed. • The vehicle speed is detected using the wheel speed sensors. ○ There is a delay in when the vehicle speed data is displayed. Therefore, even if the vehicle speed listed in the freeze frame data is 0 km/h (0 mph), this does not always mean that the malfunction occurred when the vehicle was stopped.
Engine Speed	Engine speed/ Min.: 0 rpm Max.: 16383 rpm	550 to 650 rpm: Idling	When the crankshaft position sensor is malfunctioning, "Engine Speed" is approximately 0 rpm or varies greatly from

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
			the actual engine speed.
Calculate Load	Load calculated by ECM/ Min.: 0% Max.: 100%	-	• This is the engine load calculated based on the intake pressure. • Calculate Load = Actual intake manifold pressure / maximum intake manifold pressure x 100 (%) (For example, when the actual intake manifold pressure is the same as atmospheric pressure, Calculate Load is 100%.)
Coolant Temperature	Engine coolant temperature/ Min.: -40°C (-40°F) Max.: 140°C (284°F)	75 to 100°C (167 to 212°F): After warming up	This is the engine coolant temperature. **HINT:** • After warming up the engine, the engine coolant temperature is 75 to 100°C (167 to 212°F). • After a long soak, the engine coolant temperature, intake air temperature and ambient air temperature are approximately equal. • If the value is -40°C (-40°F), or 140°C (284°F), the sensor circuit is open or shorted. • Check if the engine overheats when the value indicated is higher than 140°C (284°F).
Intake Air Temperature	Intake air temperature/ Min.: -40°C (-40°F) Max.: 140°C (284°F)	Equivalent to ambient air temperature	• After a long soak, the engine coolant temperature, intake air temperature and ambient air temperature are approximately equal. • If the value is -40°C (-40°F), or 140°C (284°F), the sensor circuit is open or shorted.
Engine Run Time	Engine run time/ Min.: 0 sec Max.: 65535 sec	Time after engine start	This is the time elapsed since the engine started. **HINT:** The time is counted only while the engine is running.
Battery Voltage	Battery voltage/ Min.: 0 V Max.: 65.5 V	11 to 14 V: Idling	If 11 V or less, characteristics of some electrical components may change.
BATT Voltage	Battery voltage/ Min.: 0 V Max.: 79.998 V	11 to 14 V: Idling	If 11 V or less, characteristics of some electrical components may change.

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Throttle Position Sensor No.1 Voltage %	Absolute throttle position sensor (No. 1)/ Min.: 0% Max.: 100%	• 10 to 22%: Accelerator pedal fully released • 64 to 96%: Accelerator pedal fully depressed (engine running)	The No. 1 throttle position sensor output is converted using 5 V = 100%. **HINT:** If there are no throttle position sensor DTCs stored, it is possible to conclude that the throttle position sensor system is normal.
Starter SW	Starter signal/ ON or OFF	• ON: Starter operating • OFF: Starter not operating	-
Neutral Position SW	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Stop Light SW	Stop light switch status/ ON or OFF	• ON: Brake pedal depressed • OFF: Brake pedal released	-
Cruise Main SW	Status of Cruise Main SW/ ON or OFF	-	-
Complete Parts Monitor	Comprehensive component monitor/ Not Avl or Avail	-	-
Fuel System Monitor	Fuel system monitor/ Not Avl or Avail	-	-
Misfire Monitor	Misfire monitor/ Not Avl or Avail	-	-
EGR/VVT Monitor	EGR/VVT monitor/ Not Avl or Avail	-	-
EGR/VVT Monitor Result	EGR/VVT monitor/ Compl or Incmpl	-	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/F (O2) Sensor Heater Monitor	A/F (O2) sensor heater monitor/ Not Avl or Avail	-	-
A/F (O2) Sensor Heater Monitor Result	A/F (O2) sensor heater monitor/ Compl or Incmpl	-	-
A/F (O2) Sensor Monitor	A/F (O2) sensor monitor/ Not Avl or Avail	-	-
A/F (O2) Sensor Monitor Result	A/F (O2) sensor monitor/ Compl or Incmpl	-	-
Secondary Air Injection System Monitor	Secondary air injection system monitor/ Not Avl or Avail	-	-
Secondary Air Injection System Monitor Result	Secondary air injection system monitor/ Compl or Incmpl	-	-
EVAP Monitor	EVAP monitor/ Not Avl or Avail	-	-
EVAP Monitor Result	EVAP monitor/ Compl or Incmpl	-	-
Heated Catalyst Monitor	Heated catalyst monitor/ Not Avl or Avail	-	-
Heated Catalyst Monitor Result	Heated catalyst monitor/ Compl or Incmpl	-	-
Catalyst Monitor	Catalyst monitor/ Not Avl or Avail	-	-
Catalyst Monitor Result	Catalyst monitor/ Compl or Incmpl	-	-
Component Monitor ENA (Current)	Comprehensive component monitor Unable or Enable	-	-
Component Monitor Result (Current)	Comprehensive component monitor Compl or Incmpl	-	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Fuel System Monitor ENA (Current)	Fuel system monitor Unable or Enable	-	-
Fuel System Monitor Result (Current)	Fuel system monitor Compl or Incmpl	-	-
Misfire Monitor ENA (Current)	Misfire monitor Unable or Enable	-	-
Misfire Monitor Result (Current)	Misfire monitor Compl or Incmpl	-	-
EGR/VVT Monitor ENA (Current)	EGR monitor Unable or Enable	-	-
EGR/VVT Monitor Result (Current)	EGR monitor Compl or Incmpl	-	-
O2 Sensor Heater ENA (Current)	O2S (A/FS) heater monitor Unable or Enable	-	-
O2 Sensor Heater Monitor Result (Current)	O2S (A/FS) heater monitor Compl or Incmpl	-	-
A/F (O2) Sensor Monitor ENA (Current)	O2S (A/FS) monitor Unable or Enable	-	-
A/F (O2) Sensor Monitor Result (Current)	O2S (A/FS) monitor Compl or Incmpl	-	-
Secondary Air Injection System Monitor ENA (Current)	Secondary air injection system monitor/ Unable or Enable	-	-
Secondary Air Injection System Monitor Result (Current)	Secondary air injection system monitor/ Compl or Incmpl	-	-
EVAP Monitor ENA (Current)	EVAP monitor Unable or Enable	-	-
EVAP Monitor Result (Current)	EVAP monitor Compl or Incmpl	-	-
Heated Catalyst Monitor ENA (Current)	Heated catalyst monitor/	-	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Unable or Enable		
Heated Catalyst Monitor Result (Current)	Heated catalyst monitor/ Compl or Incmpl	-	-
Catalyst Monitor ENA (Current)	Catalyst monitor/ Unable or Enable	-	-
Catalyst Monitor Result (Current)	Catalyst monitor/ Compl or Incmpl	-	-
TC Terminal	TC Terminal Status/ ON or OFF	-	-
MIL	MIL status/ ON or OFF	ON: MIL ON	-
MIL ON Run Distance	MIL ON run distance/ Min.: 0 km (0 mile) Max.: 65535 km (40723 mile)	Distance after DTC detected	-
Running Time from MIL ON	Running time from MIL ON/ Min.: 0 minutes Max.: 65535 minutes	Equivalent to running time after MIL ON	-
Time after DTC Cleared	Time after DTC cleared/ Min.: 0 minutes Max.: 65535 minutes	Equivalent to time after DTCs cleared	-
Distance from DTC Cleared	Distance from DTC cleared/ Min.: 0 km (0 mile) Max.: 65535 km (40723 mile)	Equivalent to time after DTCs cleared	-
Warmup Cycle Cleared DTC	Warm-up cycle after DTC cleared/ Min.: 0 Max.: 255	-	Number of warm-up cycles after DTCs cleared
OBD Requirements	OBD requirement/ -	-	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Number of Emission DTC	Emission related DTCs/ Min.: 0 Max.: 127	-	-
Total Distance Traveled	Total distance traveled/ Min.: 0 km (0 mile) Max.: 16777215 km (10425361 mile)	-	-
Accel Position from EFI	Absolute accelerator pedal position/ Min.: 0 % Max.: 127.5 %	-	Value calculated by adding an adjustment value to the actual accelerator pedal position.
NT Sensor Speed	Input turbine speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm.
Speed (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-
SP2 Sensor Voltage	Transmission revolution sensor (SP2) sensor voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-
Shift SW Status (P Range)	Park/neutral position switch status/	• ON: Shift lever in P • OFF: Shift lever	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ON or OFF	not in P	position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in R	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N, P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	-
Shift SW Status (S Range)	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/	• Approx. 80°C (176°F): After stall test	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Equal to ambient temperature when cold soak	
A/T Oil Temperature No. 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.
Torque Converter Temperature Raise History	Torque converter temperature raise history status/ Min.: 0 Max.: 255	-	-
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-
Lock Up Status	Lock up/ ON or OFF	• ON: Lock-up operating • OFF: Lock-up not operating	-
Shift Status	ECM gear shift command/ 1st, 2nd, 3rd, 4th, 5th or 6th	Same as actual gear	-
Solenoid (SLT)	Shift solenoid valve SLT status/ ON or OFF	• ON: Shift solenoid valve SLT operating • OFF: Shift solenoid valve SLT not operating	-
Solenoid (SLU)	Shift solenoid valve SLU status/ ON or OFF	• ON: Shift solenoid valve SLU operating • OFF: Shift solenoid valve SLU not operating	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Solenoid (SL1)	Shift solenoid valve SL1 status/ ON or OFF	• ON: Shift solenoid valve SL1 operating • OFF: Shift solenoid valve SL1 not operating	-
Solenoid (SL2)	Shift solenoid valve SL2 status/ ON or OFF	• ON: Shift solenoid valve SL2 operating • OFF: Shift solenoid valve SL2 not operating	-
Solenoid (SL3)	Shift solenoid valve SL3 status/ ON or OFF	• ON: Shift solenoid valve SL3 operating • OFF: Shift solenoid valve SL3 not operating	-
Solenoid (SL4)	Shift solenoid valve SL4 status/ ON or OFF	• ON: Shift solenoid valve SL4 operating • OFF: Shift solenoid valve SL4 not operating	-
Solenoid (SL)	Shift solenoid valve SL status/ ON or OFF	• ON: Shift solenoid valve SL operating • OFF: Shift solenoid valve SL not operating	-

(h) Enter the following menus: Powertrain / Engine / Data List.

(i) According to the display on the Techstream, read the Data List.

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Shift Up SW	Sport shift up switch status/ ON or OFF	• ON: Shift lever held in "+" (up-shift) • OFF: Shift lever not held in "+" (up-shift)	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Shift Down SW	Sport shift down switch status/ ON or OFF	• ON: Shift lever held in "-" (down-shift) • OFF: Shift lever not held in "-" (down-shift)	-
Power Mode SW	Power mode status/ ON or OFF	• ON: PWR mode on • OFF: PWR mode off	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the TC Terminal	Connects and disconnects TC and TE1. (changes to the fluid temperature detection mode)	ON/OFF	[Vehicle Condition] • Ignition switch ON • Vehicle stopped
Activate the Solenoid (SLU)	Operates shift solenoid valve SLU	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SLT)*	Operates shift solenoid valve SLT to raise the line pressure.	ON/OFF **HINT:** ON: No action (normal operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid	[Vehicle Condition] • Vehicle Stopped • Engine idling

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
		(SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	
Activate the Lock Up Solenoid	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF Start/Stop	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more
Activate the Solenoid (SL)	Operates shift solenoid valve SL	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd/3rd/4th/5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less
Activate the Solenoid (SL1)	Operates shift solenoid valve SL1	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL2)	Operates shift solenoid valve SL2	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL3)	Operates shift solenoid valve SL3	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL4)	Operates shift solenoid valve SL4	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
			• Shift lever in P or N

*: The "Activate the Solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

Note that the pressure readings for the Active Test and Hydraulic Test are different.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7I0U9X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DEFINITION OF TERMS; 2016 MY Tacoma [08/2015 -]		

DEFINITION OF TERMS

TERM	DEFINITION
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and details).
Related DTCs	Group of diagnostic trouble codes that are output by the ECM based on the same malfunction detection logic.
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM stores a DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring if multiple sensors and components are used to detect the malfunction. While one sensor is being monitored, the next sensor or component will not be monitored.
Required sensor / Components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects a malfunction only once during a single driving cycle. "Continuous" means that the ECM detects a malfunction every time the enabling conditions are met.
Duration	The minimum time for which the ECM must detect a continuous deviation in the monitored value(s) in order to store a DTC. Timing begins after the "typical enabling conditions" are met.
Typical malfunction thresholds	Value beyond which the ECM will determine that there is a malfunction and store a DTC.
MIL operation	MIL illumination timing after a malfunction is detected. "Immediate" means that the ECM illuminates the MIL the instant the ECM determines that there is a malfunction. "2 driving cycles" means that the ECM illuminates the MIL if the same malfunction is detected again in the next driving cycle.
Component operating range	Normal operation range of sensors and solenoids under normal driving conditions. Use these ranges as a reference. They cannot be used to judge if a sensor or solenoid is defective or not.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7613FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DIAGNOSIS SYSTEM; 2016 MY Tacoma [08/2015 -]		

DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) When troubleshooting OBD II (On-Board Diagnostics) vehicles, an OBD II scan tool (complying with SAE J1987) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle ECM (Engine Control Module) can be then read.

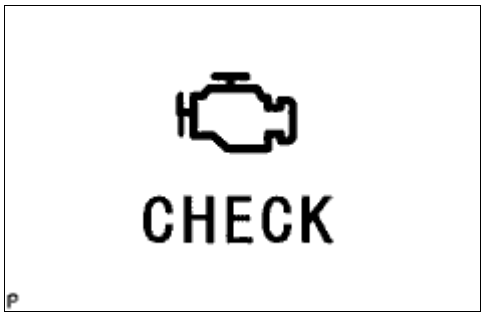
(b) OBD II regulations require that the vehicle on-board computer illuminate the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:

(1) The emission control system components.

(2) The powertrain control components (which affect vehicle emissions).

(3) The computer itself.

In addition, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



(c) To check for DTCs, connect the Techstream to the DLC3. The Techstream displays DTCs, freeze frame data, and a variety of the engine data. The DTCs and freeze frame data can be cleared with the Techstream. In order to enhance OBD function on vehicles and develop the off-board diagnosis system, Controller Area Network (CAN) communication is used in this system. CAN is a network which uses a pair of data transmission lines spanning multiple computers and sensors. It allows for high speed communications between the systems and simplification of the wire harness connections INFO .

2. NORMAL MODE AND CHECK MODE

(a) The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for duplicating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (the Techstream only).

3. 2 TRIP DETECTION LOGIC

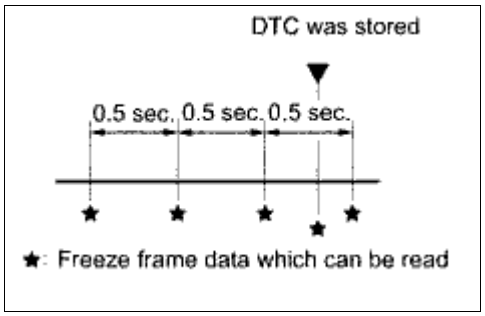
(a) When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the subsequent driving cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

(a) The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

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(b) The Techstream records freeze frame data in 5 different instances: 1) 3 times before the DTC is stored, 2) once when the DTC is stored, and 3) once after the DTC is stored. These sets of data can be used to simulate the vehicle condition around the time when the malfunction occurred. The data may help in finding the cause of the malfunction, or in judging if the DTC was caused by a temporary malfunction.



5. DLC3 (Data Link Connector 3)

(a) Check the DLC3 INFO .

6. BATTERY VOLTAGE

Standard Voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

7. MIL (Malfunction Indicator Lamp)

(a) The MIL illuminates when the turning the ignition switch to ON (the engine is not running).

(b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL does not illuminate when the turning the ignition switch to ON, check the MIL circuit INFO .

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Last Modified: 11-13-2015	6.6 S	**Doc ID:** RM000000W710R0X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DIAGNOSTIC TROUBLE CODE CHART; 2016 MY Tacoma [08/2015 -]		

DIAGNOSTIC TROUBLE CODE CHART

- If a DTC is displayed during the DTC check, check the parts listed in the table below and proceed to the "See page" given.
- *1: "Comes on" means the Malfunction Indicator Lamp (MIL) illuminates.
- *2: "DTC stored" means the ECM memorizes the trouble code if the ECM detects the DTC detection condition.
- These DTCs may be output when the clutches, brakes, gear components, etc., inside the automatic transmission are damaged.

Automatic Transmission System

DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P050031	Vehicle Speed Sensor "A" No Signal	Comes on	DTC stored	INFO
P056014	System Voltage Circuit Short to Ground or Open	Comes on	DTC stored	INFO
P061512	Starter Relay Circuit Short to Battery	Comes on	DTC stored	INFO
P062F44	Internal Control Module EEPROM Data Memory Failure	Comes on	DTC stored	INFO
P070312	Brake Switch "B" Circuit Short to Battery	Comes on	DTC stored	INFO
P070513	Transmission Range Sensor "A" Circuit Open	Comes on	DTC stored	INFO
P070562	Transmission Range Sensor "A" Signal Compare Failure	Comes on	DTC stored	INFO
P071000	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	Comes on	DTC stored	INFO
P071011	Transmission Fluid Temperature Sensor "A" Circuit Short To Ground	Comes on	DTC stored	INFO
P071015	Transmission Fluid Temperature Sensor "A" Circuit Short to Battery or Open	Comes on	DTC stored	INFO
P071512	Input/Turbine Speed Sensor "A" Circuit Short to Battery	Comes on	DTC stored	INFO
P071514	Input/Turbine Speed Sensor "A" Circuit Short to Ground or Open	Comes on	DTC stored	INFO
P071531	Input/Turbine Speed Sensor "A" No Signal	Comes on	DTC stored	INFO

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DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P072012	Output Speed Sensor Circuit Short to Battery	Comes on	DTC stored	INFO
P072014	Output Speed Sensor Circuit Short to Ground or Open	Comes on	DTC stored	INFO
P072031	Output Speed Sensor No Signal	Comes on	DTC stored	INFO
P074011	Torque Converter Clutch Circuit Short to Ground	Comes on	DTC stored	INFO
P074015	Torque Converter Clutch Circuit Short to Battery or Open	Comes on	DTC stored	INFO
P07407F	Torque Converter Clutch Actuator Stuck Off	Comes on	DTC stored	INFO
P074513	Pressure Control Solenoid "A" Circuit Open	Comes on	DTC stored	INFO
P07457F	Pressure Control Solenoid "A" Actuator Stuck Off	Comes on	DTC stored	INFO
P077513	Pressure Control Solenoid "B" Circuit Open	Comes on	DTC stored	INFO
P07757F	Pressure Control Solenoid "B" Actuator Stuck Off	Comes on	DTC stored	INFO
P079513	Pressure Control Solenoid "C" Circuit Open	Comes on	DTC stored	INFO
P07957F	Pressure Control Solenoid "C" Actuator Stuck Off	Comes on	DTC stored	INFO
P271313	Pressure Control Solenoid "D" Circuit Open	Comes on	DTC stored	INFO
P27137F	Pressure Control Solenoid "D" Actuator Stuck Off	Comes on	DTC stored	INFO
P274011	Transmission Fluid Temperature Sensor "B" Circuit Short to Ground	-	DTC stored	INFO
P274015	Transmission Fluid Temperature Sensor "B" Circuit Short to Battery or Open	-	DTC stored	INFO
P275613	Torque Converter Clutch Pressure Control Solenoid Control Circuit Open	Comes on	DTC stored	INFO
P27567F	Torque Converter Clutch Pressure Control Solenoid Control Actuator Stuck Off	Comes on	DTC stored	INFO
P280713	Pressure Control Solenoid "G" Circuit Open	Comes on	DTC stored	INFO
P28077F	Pressure Control Solenoid "G" Actuator Stuck Off	Comes on	DTC stored	INFO
U010087	Lost Communication with ECM/PCM "A" Missing Message	Comes on	DTC stored	INFO

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7712OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DTC CHECK / CLEAR; 2016 MY Tacoma [08/2015 -]		

DTC CHECK / CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are cleared. Before changing modes, always check and make a note of DTCs and freeze frame data.

HINT:

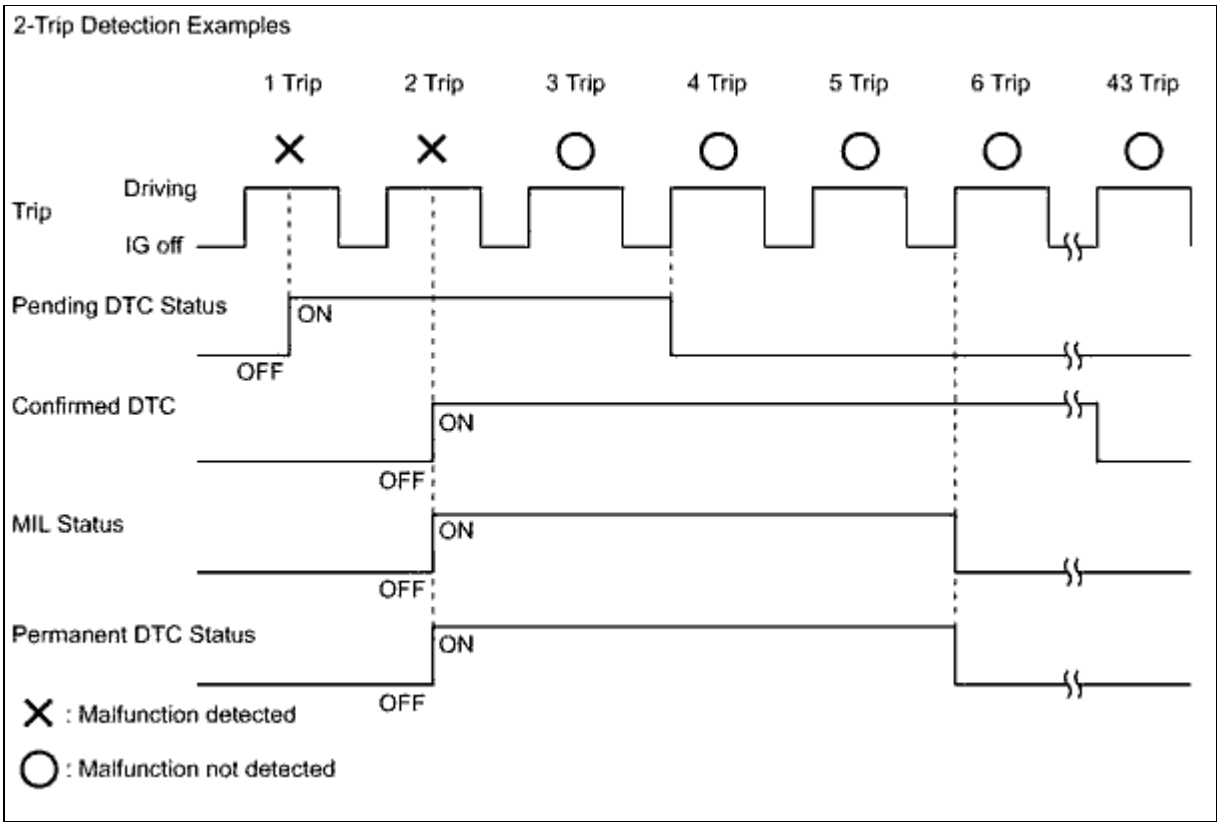
- DTCs which are stored in the ECM can be displayed on the Techstream. The Techstream can display current, pending and permanent DTCs.
- If a malfunction is detected during the current driving cycle, current and permanent DTCs are stored.
- Some DTCs are not stored if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- Current and pending DTCs can be cleared by using the Techstream or by disconnecting the cable from the negative battery terminal. However, permanent DTCs cannot be cleared using either of these two methods.
- After clearing current DTCs using the Techstream (or by disconnecting the cable from the negative battery terminal), permanent DTCs can be cleared when the system is determined to be normal for the relevant DTCs and then the universal trip is performed.

2 Trip Detection Examples

Pending DTC	Store condition	Malfunction detected
	Clear condition	System determined to be normal or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Confirmed DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	No malfunctions in 40 driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Permanent DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	Ignition switch turned to ON after no malfunction is detected in 3 consecutive driving cycles or After DTCs cleared using Techstream or cable disconnected from negative battery terminal, malfunction not detected when universal trip driving performed
MIL	ON	Malfunction detected (2nd trip)

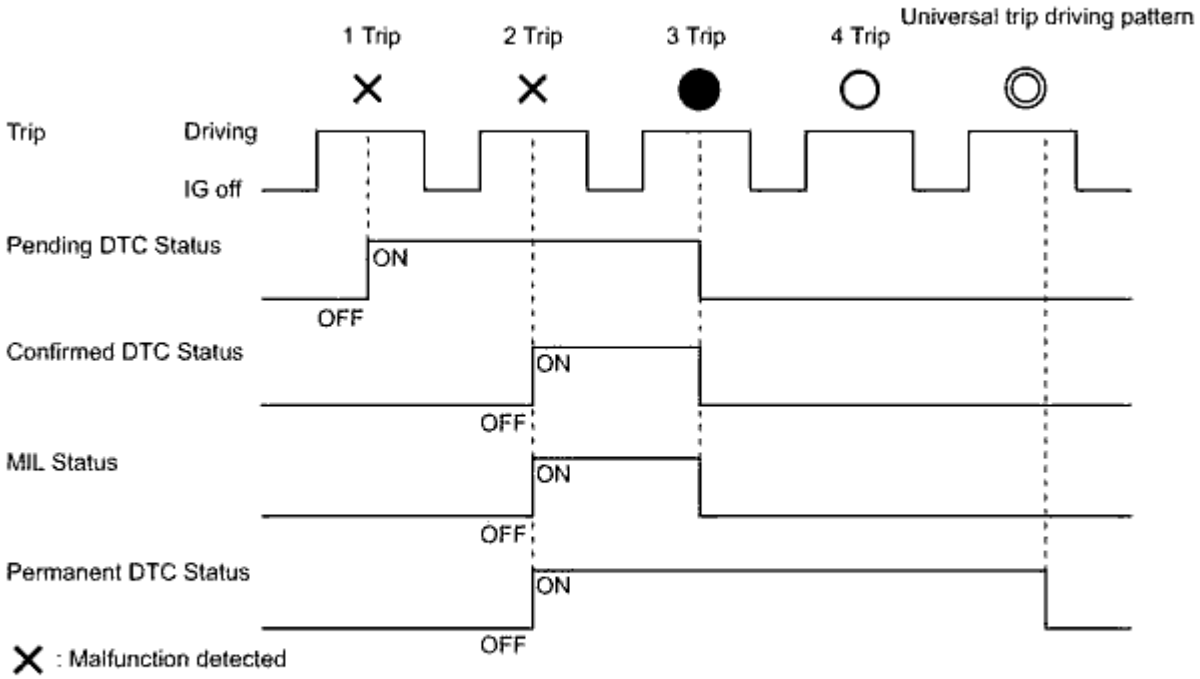
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	OFF	Ignition switch turned to ON after no malfunction is detected in 3 consecutive driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal



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2-Trip Detection Examples (Instance when DTCs were cleared midway through by using the Techstream or by disconnecting the cable from the negative battery terminal)



: Malfunction detected

: After problem areas repaired and DTCs cleared, DTC check performed

: Malfunction not detected

: Universal trip performed

1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Check the DTC(s) and freeze frame data, and then write them down.

TECHSTREAM DISPLAY	DESCRIPTION
Test Failed	Shows the malfunction judgment results during the current trip.
Pending	Shows the malfunction judgment results up to now. (Indicates the possibility of a malfunction when no DTC is confirmed.)
Confirmed	Shows the DTCs confirmed up to now. (The number of current trips differs for each DTC.)

(f) Check the details of the DTC(s) INFO .

2. CLEAR DTC (Pending and Confirmed DTC)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

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(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Clear the DTCs.

3. CLEAR PERMANENT DTC

HINT:

Even if the following procedure is not performed, permanent DTCs are cleared if no malfunction are detected during 3 consecutive driving cycles.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

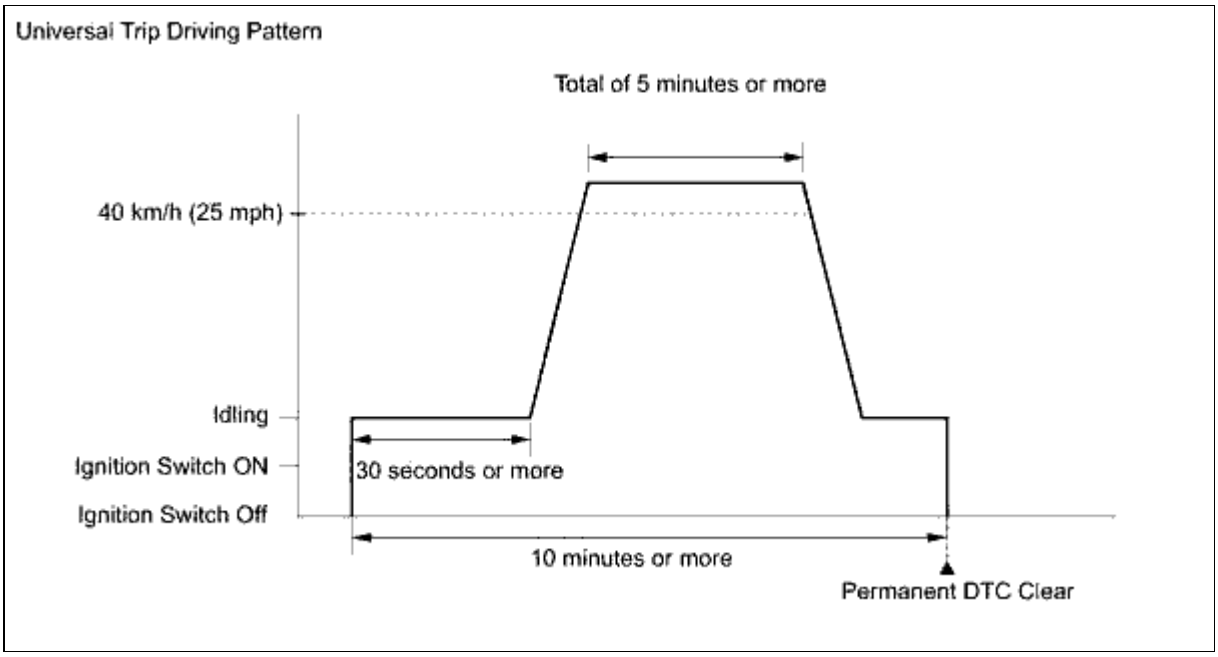
(e) Check if permanent DTCs are stored.

HINT:

If permanent DTCs are not output, it is not necessary to continue this procedure.

(f) Clear the DTCs.

(g) Perform the universal trip.



(1) Idle the engine for 30 seconds or more.

(2) Drive the vehicle at 40 km/h (25 mph) or more for a total of 5 minutes or more.

HINT:

- It is possible to complete the drive pattern even if the vehicle decelerates to less than 40 km/h (25 mph) during the driving cycle provided that the vehicle is driven at 40 km/h (25 mph) or more for a total of 5 minutes.
- When accelerating through the gears, make sure the vehicle is driven so all gears are used in order and no gears are skipped.

(3) Allow 10 minutes or more to elapse from the time the engine is started.

(h) Turn the ignition switch off.

(i) Wait 15 seconds.

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(j) Turn the ignition switch to ON.

(k) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(l) Check that the permanent DTCs have been cleared.

HINT:

- If permanent DTCs have not been cleared, perform the universal trip again.
- Permanent DTCs are cleared when the universal trip is completed.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000O8L0TWX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): FAIL-SAFE CHART; 2016 MY Tacoma [08/2015 -]		

FAIL-SAFE CHART

1. Fail-safe

This function minimizes the loss of operation when any abnormality occurs in a sensor or solenoid.

Fail-safe Control List

MALFUNCTION PART	FUNCTION
Transmission revolution sensor (NT)	During a transmission revolution sensor (NT) malfunction, shift control is performed based on the transmission revolution sensor (SP2) signal.
Transmission revolution sensor (SP2)	During a transmission revolution sensor (SP2) malfunction, shift control is performed based on the wheel speed sensor signal.
ATF temperature sensors (No. 1 and No. 2)	During an ATF temperature sensor malfunction, up-shifting to 5th and 6th is prohibited.
Shift solenoid valve SL1, SL2, SL3 and SL4	Stop the conduction of electric power to a failed solenoid and shift gears by turning on/off normal solenoids. If all solenoids are malfunctioning, gears will be selected through mechanical hydraulic circuits.
Shift solenoid valve SLT	During a shift solenoid valve SLT malfunction, the current to the shift solenoid valve is stopped. However, shifting is performed through normal clutch pressure control.
Shift solenoid valve SLU	During a shift solenoid valve SLU malfunction, the current to the shift solenoid valve is stopped. This stops lock-up control, thus decreasing fuel economy.

Shift Solenoid Valve Operation when Normal

GEAR POSITION	1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

Fail-safe Control Chart

GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON Malfunction (without Fail-safe Control)*	1st	2nd	3rd	4th	4th	4th
	OFF Malfunction (without Fail-safe Control)	1st to N	2nd to N	3rd to N	4th to N	5th	6th
	Fail-safe Control during OFF Malfunction	Fixed in 3rd or 5th					

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GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL2	ON Malfunction (without Fail-safe Control)*	1st to 4th	2nd to 4th	3rd to 4th	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd	4th to 1st	5th to N	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 2nd or 3rd					
Shift solenoid valve SL3	ON Malfunction (without Fail-safe Control)*	1st to 2nd	2nd	3rd	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd to 1st	3rd	4th	5th	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 3rd					
Shift solenoid valve SL4	ON Malfunction (without Fail-safe Control)*	3rd	3rd	3rd	4th	5th	5th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd to 1st	4th	5th to N	6th
	Fail-safe Control during OFF Malfunction	Fixed in 2nd					

*: Fail-safe control is not actuated when an ON malfunction occurs.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W6Z17NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): HOW TO PROCEED WITH TROUBLESHOOTING; 2016 MY Tacoma [08/2015 -]		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The ECM of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN and multiplex communication system.
- *: Use the Techstream.

1.	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2.	**CUSTOMER PROBLEM ANALYSIS**

(a) Refer to the How to Troubleshoot ECU Controlled Systems in Introduction section INFO .

NEXT

3.	**INSPECT BATTERY VOLTAGE**

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

4.	**CONNECT TECHSTREAM TO DLC3***

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NEXT

5.	**CHECK AND CLEAR DTCS AND FREEZE FRAME DATA***

(a) Refer to DTC Check/Clear INFO .

NEXT

6.	**VISUAL INSPECTION**

NEXT

7.	**SELECT CHECK MODE DIAGNOSIS***

(a) Refer to Check Mode Procedure INFO .

NEXT

8.	**PROBLEM SYMPTOM CONFIRMATION**

(a) Refer to Road Test INFO .

Result

RESULT	PROCEED TO
Symptom does not occur	A
Symptom occurs	B

B **GO TO STEP 10**

A

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9.	**SYMPTOM SIMULATION**

(a) Refer to Symptom Simulation INFO .

NEXT

10.	**DTC CHECK***

(a) Refer to DTC Check/Clear INFO .

Result

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B **GO TO STEP 18**

A

11.	**BASIC INSPECTION**

(a) Refer to Park/Neutral Position Switch INFO .

(b) Refer to Shift Lever Assembly INFO .

NG **GO TO STEP 21**

OK

12.	**MECHANICAL SYSTEM TESTS**

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(a) Refer to Mechanical System Tests INFO .

NG ▶ **GO TO STEP 17**

OK ▼

13.	**HYDRAULIC TEST**

(a) Refer to Hydraulic Test INFO .

NG ▶ **GO TO STEP 17**

OK ▼

14.	**MANUAL SHIFTING TEST**

(a) Refer to Manual Shifting Test INFO .

NG ▶ **GO TO STEP 16**

OK ▼

15.	**PROBLEM SYMPTOMS TABLE CHAPTER 1**

(a) Refer to Problem Symptoms Table INFO .

NG ▶ **GO TO STEP 19**

OK ▼

16.	**PROBLEM SYMPTOMS TABLE CHAPTER 2**

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(a) Refer to Problem Symptoms Table INFO .

NEXT

17.	**COMPONENT INSPECTION**

NEXT **GO TO STEP 21**

18.	**DTC CHART**

(a) Refer to Diagnostic Trouble Code Chart INFO .

NEXT

19.	**CIRCUIT INSPECTION**

NEXT

20.	**IDENTIFICATION OF PROBLEM**

NEXT

21.	**REPAIR OR REPLACE**

NEXT

22.	**CONFIRMATION TEST**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7B0UPX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): HYDRAULIC TEST; 2016 MY Tacoma [08/2015 -]		

HYDRAULIC TEST

1. PERFORM HYDRAULIC TEST

(a) Measure the line pressure.

CAUTION:

The line pressure test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.
- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.
- When conducting stall test, do not continue for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(1) Warm up the ATF (Automatic Transmission Fluid).

(2) Turn the ignition switch off.

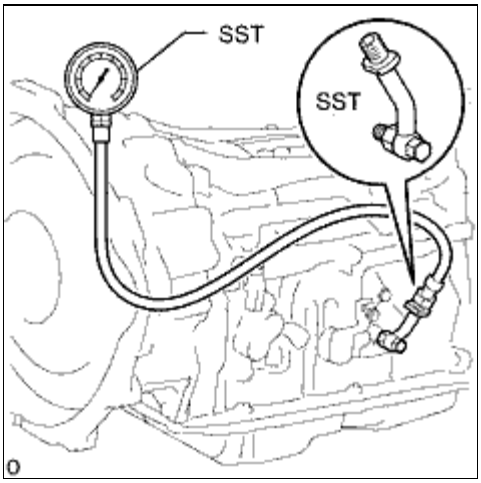
(3) Lift the vehicle up.

(4) Remove the test plug from the transmission case and connect SST.

SST: 09993-19015

09993-00010

09993-00040



(5) Lower the vehicle.

(6) Fully apply the parking brake and chock the 4 wheels.

(7) Start the engine and check the idling speed.

(8) Keep your left foot pressed firmly on the brake pedal and move the shift lever to D.

(9) Fully depress the accelerator pedal with your right foot. Quickly read the highest line pressure when the engine speed reaches the stall speed.

(10) In the same manner, perform the test with the shift lever in R.

Specified Line Pressure

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CONDITION	D POSITION	R POSITION
Stall speed	1450 to 1740 kPa (14.8 to 17.7 kgf/cm ^{2} , 210 to 252 psi)	1550 to 1840 kPa (15.8 to 18.8 kgf/cm ^{2} , 225 to 267 psi)

Evaluation

PROBLEM	POSSIBLE CAUSE
Measured values are higher than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective
Measured values are lower than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective • Oil pump defective
Pressure is low in D position only	• D position circuit fluid leak • No. 1 clutch (C1) defective
Pressure is low in R position only	• R position circuit fluid leak • No. 2 brake (B2) defective • No. 3 brake (B3) defective

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7F0S7X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): INITIALIZATION; 2016 MY Tacoma [08/2015 -]		

INITIALIZATION

1. RESET MEMORY

NOTICE:

- Perform Reset Memory (AT initialization) when replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves.
- Reset Memory can be performed only with the Techstream.

HINT:

The ECM memorizes the vehicle conditions when the ECT controls the automatic transmission assembly and transmission valve body assembly. Therefore, when the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

The reset procedure is as follows.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Utility / Reset Memory.

NOTICE:

After performing Reset Memory, be sure to perform the Road Test INFO described earlier.

HINT:

The ECM learns through the Road Test.

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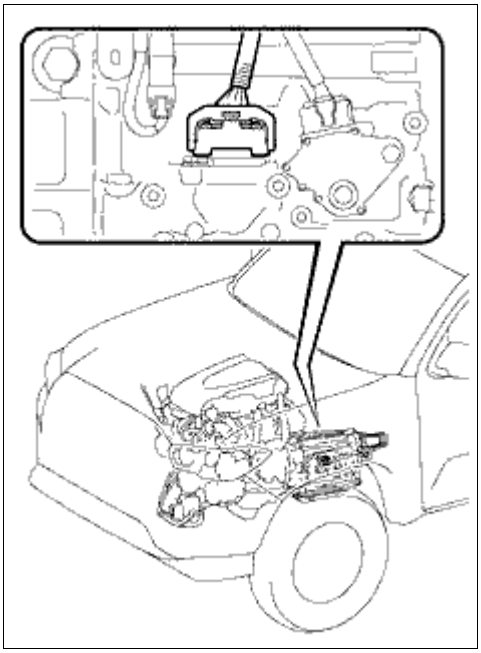
Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7C10RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): MANUAL SHIFTING TEST; 2016 MY Tacoma [08/2015 -]		

MANUAL SHIFTING TEST

1. PERFORM MANUAL SHIFTING TEST

HINT:

- Using this test, it can be determined whether a problem is in an electrical circuit or if it is a mechanical problem in the transmission.
- If any abnormalities are found in the following test, the problem is in the transmission itself.



(a) Disconnect the connector of the transmission wire.

HINT:

It is possible to deactivate the electrical shift control by disconnecting the transmission wire. The gears can then be changed mechanically with the shift lever.

(b) Drive the vehicle with the transmission wire disconnected. Move the shift lever to each position to check whether the gear changes as shown in the table below.

SHIFT LEVER POSITION	GEAR
P	P
R	R
D	3rd

(c) Connect the connector of the transmission wire.

(d) Clear the DTCs INFO .

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7A0W0X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): MECHANICAL SYSTEM TESTS; 2016 MY Tacoma [08/2015 -]		

MECHANICAL SYSTEM TESTS

1. STALL SPEED TEST

HINT:

This test is to check the overall performance of the engine and transmission.

CAUTION:

- This test should be done on a paved surface (a surface that is not slippery).
- To ensure safety, perform this test in an open and level area that provides good traction.
- The stall speed test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Do not perform the stall speed test for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Chock all 4 wheels.

(h) Set the parking brake and keep the brake pedal depressed firmly with your left foot.

(i) Move the shift lever to D.

(j) Depress the accelerator pedal as much as possible with your right foot.

(k) Read the engine speed (stall speed) and release the accelerator pedal immediately.

Standard value:

STALL SPEED	
2220 rpm	+ 200 rpm
	- 200 rpm

Evaluation

TEST RESULT	POSSIBLE CAUSE
Stall speed is lower than standard value	• Engine power output may be insufficient • Stator one-way clutch is not operating properly • Torque converter assembly is faulty (stall speed is less than standard value by 600 rpm or more)

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TEST RESULT	POSSIBLE CAUSE
Stall speed is higher than standard value	• Line pressure is too low • No. 1 clutch (C1) is slipping • No. 3 one-way clutch (F3) is not operating properly • Improper fluid level

2. SHIFT TIME LAG TEST

HINT:

When the shift lever is moved while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the clutch, and brake.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Set the parking brake and keep the brake pedal depressed firmly.

(h) Check the D position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to D and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

(i) Check the R position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to R and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

Standard value:
D position time lag is less than 1.2 seconds
R position time lag is less than 1.5 seconds

Evaluation

TEST RESULT	POSSIBLE CAUSE
D position time lag exceeds standard value	• Line pressure is too low • No. 1 clutch (C1) is worn • No. 3 one-way clutch (F3) is not operating properly
R position time lag exceeds standard value	• Line pressure is too low • No. 2 brake (B2) is worn • No. 3 brake (B3) is worn

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7K0VZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): MONITOR DRIVE PATTERN; 2016 MY Tacoma [08/2015 -]		

MONITOR DRIVE PATTERN

1. TEST MONITOR DRIVE PATTERN FOR ECT

CAUTION:

Perform this drive pattern on a level surface and strictly observe the posted speed limits and traffic laws while driving.

HINT:

Performing this drive pattern is one method to simulate the ECM (ECT) malfunction detection conditions.

Some DTCs may not be detected through ordinary, everyday driving. Also, DTCs may not be detected through this drive pattern.

(a) Preparation for driving

(1) Warm up the engine sufficiently (engine coolant temperature is 60°C (140°F) or higher).

(2) Drive the vehicle when the atmospheric temperature is -10°C (14°F) or higher.

Some malfunctions are not detected when the atmospheric temperature is below -10°C (14°F).

(b) Drive pattern

(1) Drive the vehicle through all the gears.

Stop → 1st → 2nd → 3rd → 4th → 5th → 6th → 6th (lock-up ON).

(2) Perform an engine brake test with the shift lever in S. While driving in the S6 range and 6th gear lock-up, move the shift lever to "-" and down-shift from 6th → 5th, 5th → 4th, 4th → 3rd, 3rd → 2nd and 2nd → 1st.

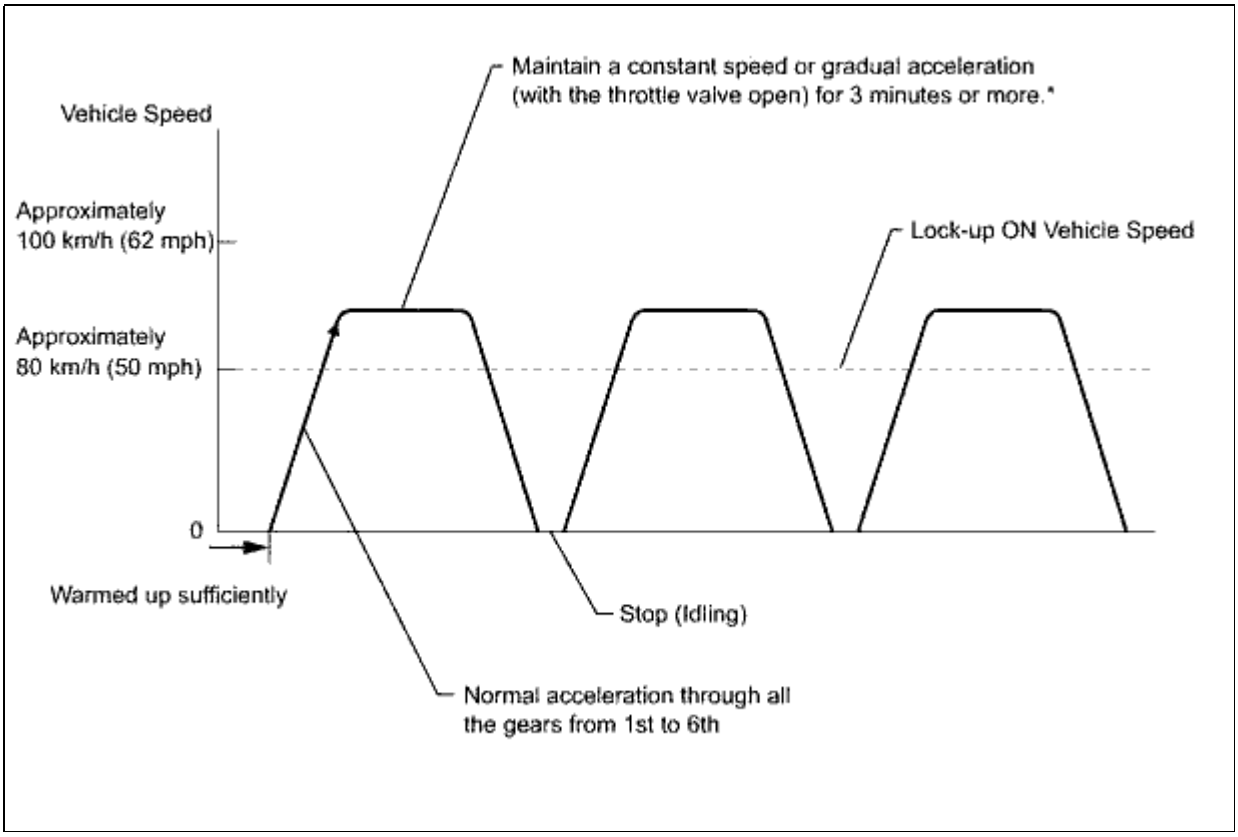
Check that engine braking is normal for every down-shift.

(3) Repeat the above drive pattern three times or more.

NOTICE:

- When using the Techstream, the monitor status can be checked in the Data List INFO .
- In the event that the drive pattern must be interrupted (due to traffic conditions or other factors), the drive pattern can be resumed and, in most cases, the monitor can be completed.

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HINT:

*: Drive the vehicle at a speed in top gear that will cause lock-up to engage. The vehicle can be driven at a speed lower than that in the above diagram under the lock-up condition.

NOTICE:

It is necessary to drive the vehicle for approximately 30 minutes to detect DTC P071000 (No. 1 ATF temperature sensor malfunction).

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5U002X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P050031; Vehicle Speed Sensor "A" No Signal; 2016 MY Tacoma [08/2015 -]		

DTC	**P050031**	**Vehicle Speed Sensor "A" No Signal**

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU. The skid control ECU converts these wheel speed signals into a pulse signal and outputs it to the ECM via the combination meter. The ECM determines the vehicle speed based on the frequency of this pulse signal.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P050031	All conditions are met for 5 seconds or more (1 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Either condition is met. • Gear position is 1st: Transmission revolution sensor (NT) value is 1310 rpm or more. • Gear position is 2nd, 3rd, 4th, 5th or 6th: Transmission revolution sensor (NT) value is 760 rpm or more. (c) Transmission revolution sensor (SP2) value is 9 km/h (5.59 mph) or more. (d) No vehicle speed is transmitted to the ECM.	• Open or short in vehicle speed signal circuit • Combination meter system • ECM	P0500

MONITOR DESCRIPTION

The ECM assumes that the vehicle is being driven when the indicated vehicle speed is 9 km/h (5.59 mph) or more. If there is no speed signal from the combination meter despite this condition being met, the ECM interprets this as a malfunction in the speed signal circuit. The ECM then illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0500: Vehicle speed sensor/Verify pulse input
Required sensors/components (Main)	Vehicle speed sensor, Combination meter, Skid control ECU
Required sensors/components (Sub)	Transmission revolution sensor (SP2), ECT sensor
Frequency of operation	Continuous
Duration	5 sec.
MIL operation	Immediately
Sequence operation	None

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TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
Engine	Running
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
D position switch	ON
Park/neutral position switch (NSW)	OFF
Time after ignition switch OFF to ON	3 sec. or more
Pressure control solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected
Vehicle speed at output speed sensor	9 km/h (5.59 mph) or more
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more
2. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

Vehicle speed sensor signal	No signal

WIRING DIAGRAM

Refer to SFI system DTC P050031 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the Ignition switch ON and wait for 3 seconds or more.
2. Drive the vehicle at 9 km/h (5.59 mph) or more for 5 seconds or more.

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3. Check for DTCs again INFO .

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (VEHICLE SPEED)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) Drive the vehicle.

(f) In accordance with the display on the Techstream, read the Data List.

Transmission

TECHSTREAM DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	• This is the current vehicle speed. • The vehicle speed is detected using the wheel speed sensors. ○ There is a delay in when the vehicle speed data is displayed. Therefore, even if the vehicle speed listed in the freeze frame data is 0 km/h (0 mph), this does not always mean that the malfunction occurred when the vehicle was stopped.

OK:
Vehicle speed displayed on Techstream and speedometer display are equal.

NG ▶ **GO TO STEP 2**

OK ▶ **CHECK FOR INTERMITTENT PROBLEMS**

2.	**CHECK COMBINATION METER SYSTEM**

(a) Check the circuits that send vehicle speed signals to this system in the meter system INFO .

(b) During inspection for the meter section, if there is an instruction that indicates to go back to inspections for each system, proceed to the next step.

NEXT

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3.	**CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - ECM)**

(a) Disconnect the C9 combination meter assembly connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C9-40 (+S) - E13-24 (SPD)	Always	Below 1 Ω
C9-40 (+S) or E13-24 (SPD) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5V002X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P056014; System Voltage Circuit Short to Ground or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P056014**	**System Voltage Circuit Short to Ground or Open**

DESCRIPTION

The battery supplies power to the ECM even when the ignition switch is off. This power allows the ECM to store data such as DTC history, freeze frame data and fuel trim values. If the battery voltage falls below a minimum level, the ECM data is cleared and the ECM determines that there is a malfunction in the power supply circuit. The next time the engine is started, the ECM will illuminate the MIL and store the DTC.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P056014	Open or short in ECM back-up power source circuit for 3 seconds or more (1 trip detection logic).	• Back-up power source circuit • Battery terminals • Battery • ECM	P0562

HINT:

If DTC P056014 is stored, the ECM does not store other DTCs.

MONITOR STRATEGY

Related DTCs	P0560: ECM system voltage/Range check (Low voltage)
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Sub)	-
Frequency of Operation	Continuous
Duration	3 sec.
MIL Operation	Immediately (MIL illuminated after next engine start)
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

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Continuous battery voltage	Below 3.5 V

WIRING DIAGRAM

Refer to SFI system DTC P056014 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the Ignition switch ON and wait for 3 seconds or more.
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT BATTERY**

(a) Inspect that the battery is not depleted INFO .

OK:

Battery is not depleted

NG ▶ **CHARGE OR REPLACE BATTERY**

OK ▼

2.	**CHECK BATTERY TERMINAL**

(a) Check that the battery terminals are not loose or corroded.

OK:

Battery terminals are not loose or corroded

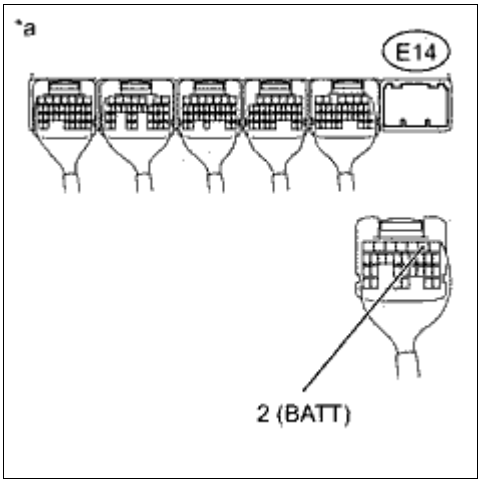
NG ▶ **REPAIR OR REPLACE BATTERY TERMINAL**

OK ▼

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3.	**CHECK TERMINAL VOLTAGE (POWER SOURCE OF ECM)**

(a) Disconnect the ECM connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E14-2 (BATT) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (BATTERY - ECM)**

OK ▼

4.	**CHECK WHETHER DTC OUTPUT RECURS (DTC P056014)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Clear the DTCs INFO .

(e) Turn the Ignition switch off and wait for at least 30 seconds.

(f) Turn the Ignition switch ON.

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(g) Turn the Techstream on.

(h) Wait 5 seconds or more.

(i) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(j) Read the DTCs using the Techstream.

Result:

RESULT	PROCEED TO
DTC P056014 is output	A
DTC is not output	B

B ▶ **CHECK FOR INTERMITTENT PROBLEMS**

A ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5W002X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P061512; Starter Relay Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P061512**	**Starter Relay Circuit Short to Battery**

DESCRIPTION

While the engine is being cranked, positive battery voltage is applied to terminal STA of the ECM. If the ECM detects the starter control (STA) signal while the vehicle is being driven, it determines that there is a malfunction in the STA circuit. The ECM then illuminates the MIL and stores the DTC.

This monitor runs when the vehicle is driven at 20 km/h (12.43 mph) or more for 20 seconds or more.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P061512	All of the following conditions are met, and a (+B) battery voltage of 10.5 V or higher is applied to the ECM for 20 seconds or more (1 trip detection logic): (a) The vehicle speed is 20 km/h (12.43 mph) or more. (b) The engine speed is 1000 rpm or more. (c) The STA signal is on.	• Park/Neutral position switch • STA signal circuit • ECM	P0617

MONITOR STRATEGY

Related DTCs	P0617: Starter signal/Verify input signal
Required Sensors/Components (Main)	Starter relay (ST), Park/neutral position switch, Certification ECU (smart key ECU assembly)*1
Required Sensors/Components (Sub)	Vehicle speed sensor (VSS), Crankshaft Position (CKP) sensor
Frequency of Operation	Continuous
Duration	20 sec.
MIL Operation	Immediately
Sequence of Operation	None

*1: w/ Smart key system

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	10.5 V or higher
Ignition switch	ON

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Vehicle speed	20 km/h (12.43 mph) or more
Engine speed	1000 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

Starter signal	ON

WIRING DIAGRAM

Refer to SFI system DTC P061512 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Drive the vehicle for 20 seconds or more under the following conditions:
   - Engine speed is 1000 rpm or more.
   - Vehicle speed is 20 km/h (12.43 mph) or more.
2. Check for DTCs again INFO .

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (STARTER SW)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

Transmission

TECHSTREAM DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Starter SW	Starter signal/ ON or OFF	ON: Starter operating OFF: Starter not operating	-

(e) Check the value displayed on the Techstream when the vehicle is driven at 20 km/h (12.43 mph) or more.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

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CONDITION	STARTER SW	PROCEED TO
Driving at 20 km/h (12.43 mph) or more	OFF	A
	ON	B

B ▶ **GO TO STEP 2**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

2.	INSPECT PARK/NEUTRAL POSITION SWITCH

(a) Inspect the park/neutral position switch INFO .

NG ▶ **REPLACE PARK / NEUTRAL POSITION SWITCH**

OK
▼

3.	REPAIR OR REPLACE HARNESS OR CONNECTOR (STA SIGNAL CIRCUIT)

(a) Repair or replace harness or connector (STA signal circuit).

NEXT
▼

4.	CHECK WHETHER DTC OUTPUT RECURS (DTC P061512)

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Clear the DTCs INFO .

(e) Turn the Ignition switch off and wait for at least 30 seconds.

(f) Turn the Ignition switch ON and turn the Techstream on.

(g) Start the engine.

(h) Idle the engine for 5 seconds or more.

(i) Drive the vehicle at 24 km/h (15 mph) or more for 20 seconds or more.

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CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

(j) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(k) Read the DTCs using the Techstream.

Result:

RESULT	PROCEED TO
DTC P061512 is output	A
DTCs are not output	B

B ▶ **END**

A ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000003Q3G078X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P062F44; Internal Control Module EEPROM Data Memory Failure; 2016 MY Tacoma [08/2015 -]		

DTC	**P062F44**	**Internal Control Module EEPROM Data Memory Failure**

DESCRIPTION

The ECM monitors its internal operation and it will set this DTC when it detects an internal malfunction.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P062F44	ECM internal error (EEPROM)	ECM	P062F

MONITOR DESCRIPTION

The ECM monitors its internal operation. If the internal operation is malfunctioning, the ECM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P062F: Internal control module EEPROM error/ Functional
Required sensors/Components (Main)	ECM
Required sensors/Components (Related)	-
Frequency of operation	Once per driving cycle
Duration	10 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None

Case 1:

All of the following conditions are met	-
Permanent Fault Code	Not stored
OBDII system commands	Store
Battery voltage	8 V or higher

Case 2:

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All of the following conditions are met	-
Permanent Fault Code	Stored
OBDII system commands	Clear
Battery voltage	8 V or higher

Case 3:

Battery voltage	8 V or higher

TYPICAL MALFUNCTION THRESHOLDS

Case 1:

Either of the following conditions is met (2 data)	1 or 2
1. Either of the following conditions is met (10 times)	(a), (b) or (c)
(a) EEPROM communication timeout	Occurred
(b) Permanent Fault Code	Not stored
(c) Permanent Fault Code	Not equal to commanded Fault Code
2. Storing processing is more than 0.096 seconds	Not completed

Case 2:

Either of the following conditions is met (2 data)	1 or 2
1. Either of the following conditions is met (10 times)	(a) or (b)
(a) EEPROM communication timeout	Occurred
(b) Permanent Fault Code	Stored
2. Storing processing is more than 0.096 seconds	Not completed

Case 3:

Either of the following conditions is met (2 data)	1 or 2
1. Either of the following conditions is met (10 times)	(a) or (b)
(a) EEPROM communication timeout	Occurred
(b) Reading processing is more than 0.096 seconds	Not completed
2. Permanent Fault Code data (10 times)	Mismatch

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative

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(-) battery terminal notices before proceeding with work INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Check the battery voltage is 9.5 V or higher.
2. Turn the ignition switch ON.
3. Check for DTCs again INFO .

PROCEDURE

1.	**READ OUTPUT DTC (DTC P062F44)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear DTCs INFO .

(e) Turn the ignition switch off and turn the Techstream off.

(f) Disconnect the Techstream.

(g) Disconnect the cable from the negative (-) battery terminal and wait for 1 minute.

(h) Connect the cable to the negative (-) battery terminal.

(i) Connect the Techstream to the DLC3.

(j) Turn the ignition switch to ON.

(k) Turn the Techstream on.

(l) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(m) Read DTCs.

Result

RESULT	PROCEED TO
No DTC output	A
P062F44 is output	B

B ▶ **REPLACE ECM**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5X002X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P070312; Brake Switch "B" Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P070312**	**Brake Switch "B" Circuit Short to Battery**

DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling while driving in lock-up when the brakes are suddenly applied.

When the brake pedal is depressed, this switch sends a signal to the ECM. Then the ECM cancels the operation of the lock-up clutch while braking is in progress.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P070312	Stop light switch remains on even when the vehicle is driven in a stop (less than 3 km/h (1.86 mph)) and go (30 km/h (18.65 mph) or more) pattern 5 times (2 trip detection logic).	• Short in stop light switch signal circuit • Stop light switch • ECM	P0724

MONITOR DESCRIPTION

This DTC indicates that the stop light switch remains on. When the stop light switch remains on during stop and go driving, the ECM interprets this as a fault in the stop light switch. Then the MIL illuminates and the ECM stores the DTC. The vehicle must stop (less than 3 km/h (1.86 mph)) and go (30 km/h (18.65 mph) or more) 5 times for 2 driving cycles in order for the DTC to be stored.

MONITOR STRATEGY

Related DTCs	P0724: Stop light switch/Verify switch input
Required sensors/Components	Stop light switch
Frequency of operation	Continuous
Duration	GO and STOP 5 times
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The stop light switch remains on during GO and STOP 5 times.

GO and STOP are defined as follows:

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The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
GO: Vehicle speed	30 km/h (18.65 mph) or more
STOP: Vehicle speed	Less than 3 km/h (1.86 mph)

TYPICAL MALFUNCTION THRESHOLDS

Stop light switch	ON

WIRING DIAGRAM

Refer to SFI system DTC P05042B INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the following stop and go drive pattern 5 times:*1
    - Accelerate the vehicle to 30 km/h (18.65 mph) or more, depress the brake pedal and decelerate the vehicle to 3 km/h (1.86 mph) or less.
2. Turn the Ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) According to the display on the Techstream, read the Data List.

Transmission

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Stop Light Switch	Stop light switch status/ ON or OFF	• ON: Brake pedal depressed • OFF: Brake pedal released	-

Result:

RESULT	PROCEED TO
Data List value is normal	A
Data List value is not normal	B

B ▶ **GO TO STEP 2**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

2.	CHECK STOP LIGHT SWITCH ASSEMBLY INSTALLATION

(a) Check the stop light switch assembly installation INFO .

OK:
Stop light switch is installed correctly.

NG ▶ **SECURELY REINSTALL STOP LIGHT SWITCH ASSEMBLY**

OK ▼

3.	CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - ECM)

(a) Disconnect the S10 stop light switch assembly connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
S10-1 or E13-16 (STP) - Other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

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OK

4.	**CHECK STOP LIGHT SWITCH ASSEMBLY**

(a) Check the stop light switch assembly INFO .

NG ▶ **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8417YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P070513,P070562; Transmission Range Sensor "A" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P070513**	**Transmission Range Sensor "A" Circuit Open**

DTC	**P070562**	**Transmission Range Sensor "A" Signal Compare Failure**

DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P070513	All of the following signals are OFF simultaneously for 60 seconds or more (2 trip detection logic): • NSW input signal • P input signal • R input signal • N input signal • D input signal	• Open or short in park/neutral position switch circuit • Park/neutral position switch • ECM	P0705
P070562	Any 2 or more of the following signals are ON simultaneously for 2 seconds or more (2 trip detection logic): • One of the following conditions is met. ○ P input signal is ON ○ N input signal is ON ○ NSW input signal is ON • R input signal • D input signal	• Open or short in park/neutral position switch circuit • Park/neutral position switch • ECM	P0705

MONITOR DESCRIPTION

This DTC indicates a problem with the park/neutral position switch and the wire harness in the park/neutral position switch circuit.

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

For safety, the park/neutral position switch detects the shift lever position so that the engine can be started only when the shift lever is in P or N.

The park/neutral position switch sends a signal to the ECM according to the shift lever position (P, R, N, D or S). The ECM determines that there is a problem with the switch or related parts if it receives more than 1 position signal simultaneously. The ECM will illuminate the MIL and store the DTC.

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MONITOR STRATEGY

Related DTCs	P0705: Park/neutral position switch/Verify switch input
Required sensors/Components	Park/neutral position switch
Frequency of operation	Continuous
Duration	P070513: 60 sec. P070562: 2 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not stored	None
Ignition switch	ON
Battery voltage	10.5 V or more
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

P070513:

All of the following conditions are met

P position switch	OFF
N position switch	OFF
Park/neutral position switch (NSW)	OFF
R position switch	OFF
D position switch	OFF

P070562:

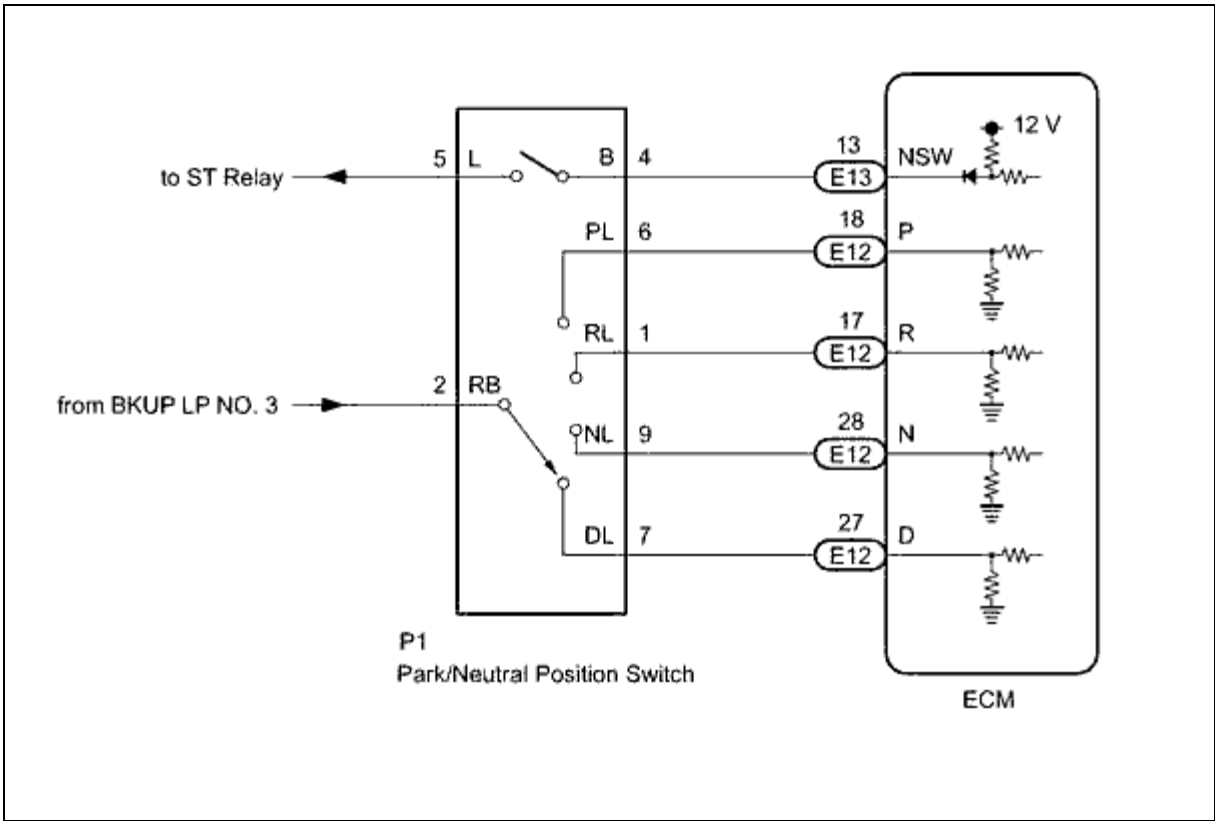
Any two of the following conditions are met:	Conditions 1, 2 and 3
1. One of the following conditions is met:	Conditions (a), (b) or (c)
(a). P position switch	ON
(b). Park/neutral position switch (NSW)	ON
(c). N position switch	ON
2. R position switch	ON
3. D position switch	ON

COMPONENT OPERATING RANGE

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Park/neutral position switch	The park/neutral position switch sends only one signal to the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the ignition switch to ON.*1
2. Wait with the shift lever in each position (P, R, N and D) for 60 seconds or more.*2
3. Turn the ignition switch off.
4. Perform steps (*1) through (*2) again.
5. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely

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on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

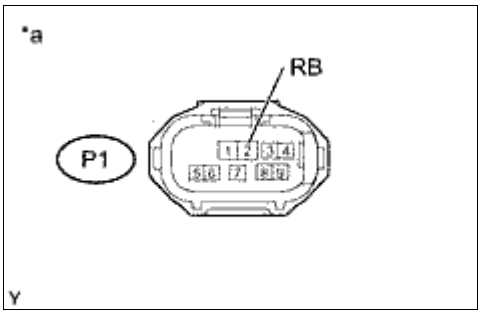
TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Neutral Position SW	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P • OFF: Shift lever not in P	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in R	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.

PROCEDURE

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1.	**CHECK HARNESS AND CONNECTOR (BATTERY - PARK/NEUTRAL POSITION SWITCH)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-2 (RB) - Body ground	Ignition switch ON	11 to 14 V
P1-2 (RB) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

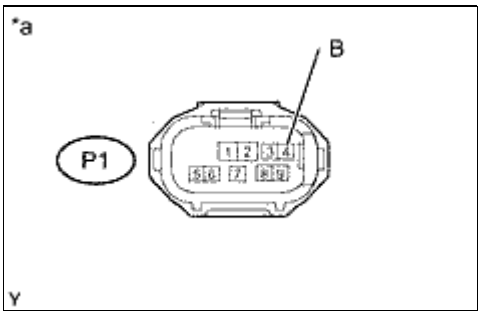
*a	Front view of wire harness connector (to Park/Neutral Position Switch)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

2.	**CHECK HARNESS AND CONNECTOR (NSW TERMINAL VOLTAGE)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

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TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-4 (B) - Body ground	Ignition switch ON	11 to 14 V
P1-4 (B) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

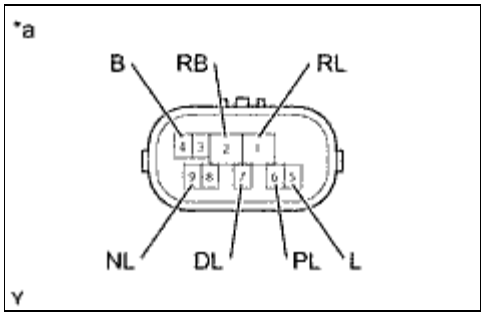
*a	Front view of wire harness connector (to Park/Neutral Position Switch)

NG ▶ **GO TO STEP 5**

OK
▼

3.	**INSPECT PARK/NEUTRAL POSITION SWITCH**

(a) Disconnect the P1 park/neutral position switch connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (B) - 5 (L)	Shift lever in P or N	Below 1 Ω
2 (RB) - 6 (PL)	Shift lever in P	Below 1 Ω
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
2 (RB) - 9 (NL)	Shift lever in N	Below 1 Ω
2 (RB) - 7 (DL)	Shift lever in D, S, "+" or "-"	Below 1 Ω
4 (B) - 5 (L)	Shift lever not in P or N	10 kΩ or higher
2 (RB) - 6 (PL)	Shift lever not in P	10 kΩ or higher
2 (RB) - 1 (RL)	Shift lever not in R	10 kΩ or higher
2 (RB) - 9 (NL)	Shift lever not in N	10 kΩ or higher
2 (RB) - 7 (DL)	Shift lever not in D, S, "+" or "-"	10 kΩ or higher

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Text in Illustration

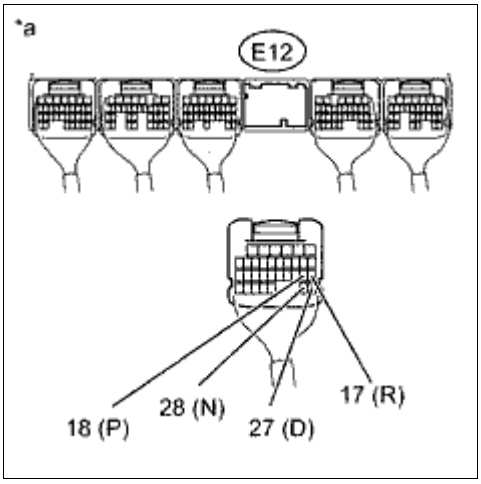
*a	Component without harness connected (Park/Neutral Position Switch)

NG ▶ **REPLACE PARK/NEUTRAL POSITION SWITCH**

OK
▼

4.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)**

(a) Disconnect the ECM connector.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-18 (P) - Body ground	• Ignition switch ON • Shift lever in P	11 to 14 V
E12-17 (R) - Body ground	• Ignition switch ON • Shift lever in R	11 to 14 V*
E12-28 (N) - Body ground	• Ignition switch ON • Shift lever in N	11 to 14 V
E12-27 (D) - Body ground	• Ignition switch ON • Shift lever in D, S, "+" or "-"	11 to 14 V

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-18 (P) - Body ground	• Ignition switch ON • Shift lever not in P	Below 1 V
E12-17 (R) - Body ground	• Ignition switch ON • Shift lever not in R	Below 1 V
E12-28 (N) - Body ground	• Ignition switch ON • Shift lever not in N	Below 1 V
E12-27 (D) - Body ground	• Ignition switch ON • Shift lever not in D, S, "+" or "-"	Below 1 V

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

HINT:

*: The voltage will drop slightly due to lighting up of the backup light.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

5.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)**

(a) Disconnect the P1 park/neutral position switch connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P1-4 (B) - E13-13 (NSW)	Always	Below 1 Ω
P1-4 (B) or E13-13 (NSW) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W7Z0SQX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071000; Transmission Fluid Temperature Sensor "A" Circuit Range/Performance; 2016 MY Tacoma [08/2015 -]		

DTC	**P071000**	**Transmission Fluid Temperature Sensor "A" Circuit Range/Performance**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071000	Either condition is met: (2 trip detection logic) • (a) Certain monitor enabling conditions are met and the No. 1 ATF temperature is below 20°C (68°F) • (b) Certain monitor enabling conditions are met and the No. 1 ATF temperature is 110°C (230°F) or higher	No. 1 ATF temperature sensor (transmission wire)	P0711

MONITOR DESCRIPTION

This DTC indicates that there is a problem with output signals from the No. 1 ATF temperature sensor and that the sensor itself is defective. The No. 1 ATF temperature sensor converts the ATF temperature into an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit or a fault of the No. 1 ATF temperature sensor.

After running the vehicle for a certain period, the ATF temperature should increase. If the ATF temperature is below 20°C (68°F) after running the vehicle for a certain period, the ECM interprets this as a malfunction, illuminates the MIL and stores the DTC.

When the ATF temperature is 110°C (230°F) or higher and the engine coolant temperature takes 10 seconds or more to reach 60°C (140°F) after a cold start, the ECM also determines this as a malfunction, illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0711: ATF temperature sensor/Rationality check
Required sensors/Components	ATF temperature sensor (TFT sensor)

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Frequency of operation	Continuous
Duration	Condition (A), (B), (C) and (D): 3 sec. Condition (E): Continuous
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0112, P0113 (IAT (Intake air temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system) P2610 (Soak timer circuit)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
IAT (Intake air temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Soak timer circuit	Not circuit malfunction

Condition (A):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	10 min. or more
Accumulated driving time*1	100 sec. or more
Driving distance after engine start*3	4.9 km (3.04 miles) or more
IAT*4	15°C (59°F) or higher
ECT (12 sec. after engine start)	15°C (59°F) or higher
Soak time	5 hours or more

Condition (B):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	21 min. and 40 sec. or more
Accumulated driving time*1	200 sec. or more
Driving distance after engine start*3	9 km (5.6 miles) or more
IAT*4	-10°C (14°F) or higher
ECT (12 sec. after engine start)	-10°C (14°F) or higher

Condition (C):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	30 min. or more
Accumulated driving time*1	400 sec. or more
Driving distance after engine start*3	16 km (9.9 miles) or more
IAT*4	-15°C (5°F) or higher
ECT (12 sec. after engine start)	-15°C (5°F) or higher

Condition (D):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	55 min. or more
Accumulated driving time*1	750 sec. or more
Driving distance after engine start*3	27 km (16.8 miles) or more

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Condition (E):

Time after ECT reaches 60°C (140°F)	10 sec. or more
ATF temperature (12 sec. after engine start)	110°C (230°F) or higher
ECT (12 sec. after engine start)	Below 35°C (95°F)

HINT:

*1: Following conditions are met

Engine speed - Turbine speed	50 rpm or more
Output speed	400 rpm or more
Throttle valve opening angle	3% or more
Shift position	Not "N" or "P"
Engine	Running
However, accumulated driving time is cleared	-
When following condition met	-
Duration time from shifting to "N" or "P"	300 sec. or more

*2: Time after engine start is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*3: Driving distance is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*4: IAT is measured when either of following conditions met

12 sec. after engine start	-
Duration time from shifting to "N" or "P"	300 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

When either condition below is met: Condition (A), (B), (C) and (D) or (E)

Condition (A), (B), (C) and (D):

ATF temperature	Below 20°C (68°F)

Condition (E):

ATF temperature	110°C (230°F) or higher

COMPONENT OPERATING RANGE

ATF temperature	20°C (68°F) or higher, and Below 110°C (230°F)

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.*1
2. Drive the vehicle 27 km (16.8 miles) or more over a period of 12 minutes and 30 seconds or more.*2
3. After 55 minutes or more have elapsed since performing step (*1), turn the ignition switch off.*3
4. Perform steps (*1) through (*3) again.
5. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P071011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P071015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

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TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

If a circuit related to the No. 1 ATF temperature sensor becomes open, P071015 is immediately stored (in 0.5 seconds). When P071015 is stored, P071000 cannot be stored.

It is not necessary to inspect the circuit when P071000 is stored.

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P071000)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P071000 is output	A
P071000 and other DTCs are output	B

HINT:

If any other codes besides P071000 are output, perform troubleshooting for those DTCs first.

B ▶ **GO TO DTC CHART**

A ▼

2.	**CHECK TRANSMISSION FLUID LEVEL**

(a) Check the transmission fluid level INFO .

OK:

Automatic transmission fluid level is correct.

NG ▶ **ADJUST FLUID LEVEL**

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OK ▶ REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W850U8X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071011; Transmission Fluid Temperature Sensor "A" Circuit Short To Ground; 2016 MY Tacoma [08/2015 -]		

DTC	**P071011**	**Transmission Fluid Temperature Sensor "A" Circuit Short To Ground**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071011	The output voltage from the No. 1 ATF temperature sensor is below 0.142 V for 0.5 seconds or more (1 trip detection logic).	• Short in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM	P0712

MONITOR DESCRIPTION

The No. 1 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects a short in the No. 1 ATF temperature sensor circuit. If the resistance value of the No. 1 ATF temperature sensor is below 79 Ω*, the ECM interprets this as a fault in the No. 1 ATF temperature sensor or wiring. The ECM will illuminate the MIL and store the DTC.

*: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

MONITOR STRATEGY

Related DTCs	P0712: ATF temperature sensor/Range check (Low voltage)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately

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Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not stored	None
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

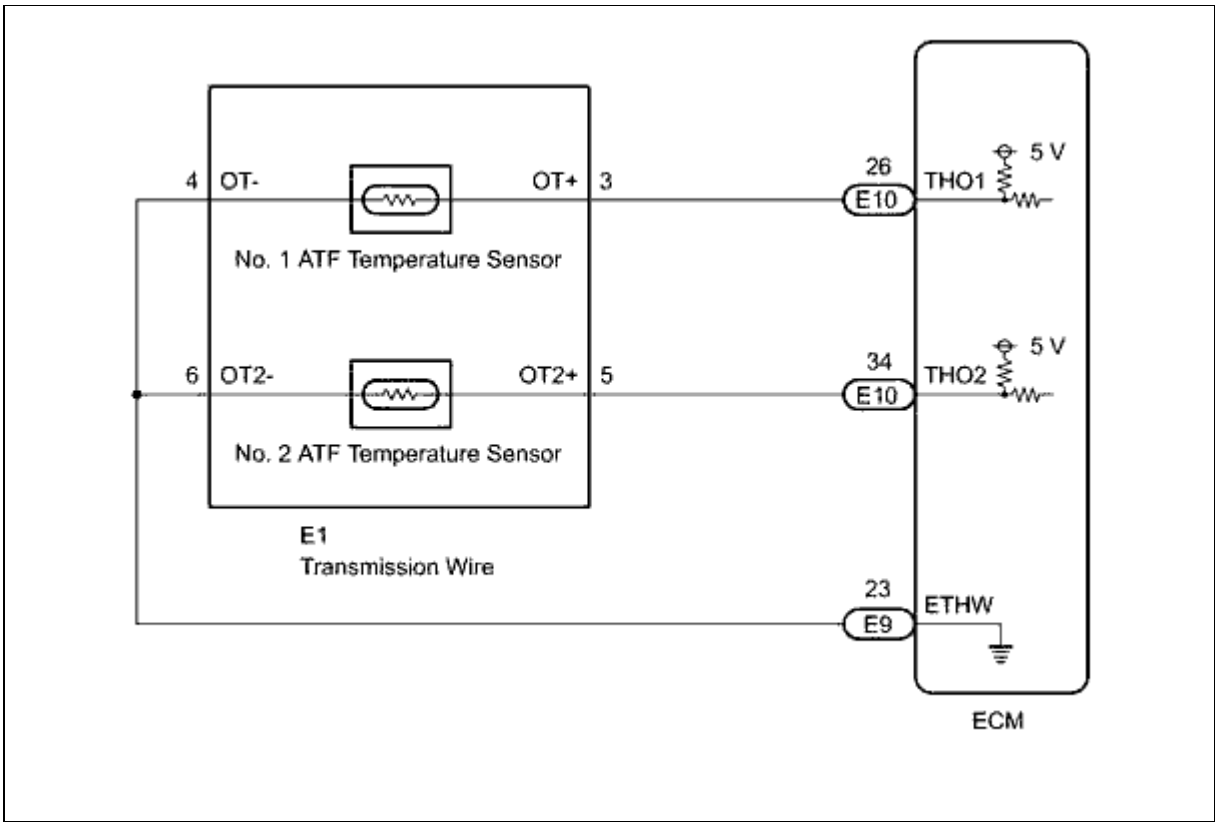
TYPICAL MALFUNCTION THRESHOLDS

ATF temperature sensor voltage (ATF temperature)	Below 0.142 V (Higher than 164°C (327°F))

COMPONENT OPERATING RANGE

ATF temperature sensor voltage (ATF temperature)	0.142 V or higher, and 4.915 V or less (-48°C (-54°F) or higher, and 164°C (327°F) or less)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 3 seconds or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P071011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P071015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

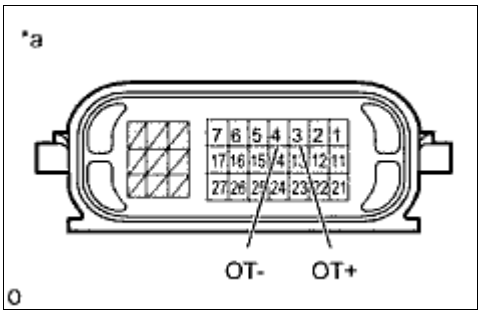
TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

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PROCEDURE

1.	**INSPECT NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
3 (OT+) or 4 (OT-) - Body ground and other terminals	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

*a	Component without harness connected (Transmission Wire)

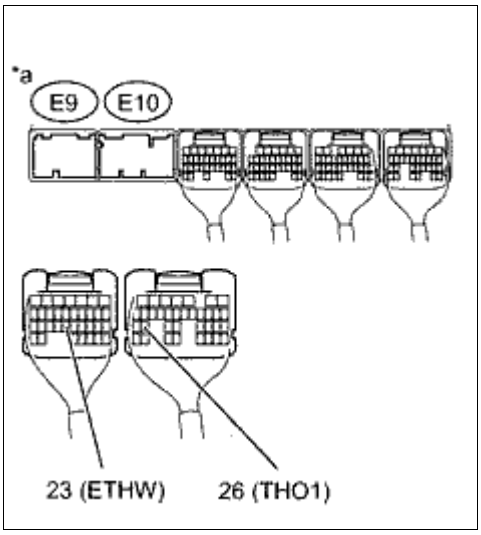
NG ▶ **REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-26 (THO1) - E9-23 (ETHW)	Always	79 Ω to 156 kΩ
E10-26 (THO1) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W850U9X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071015; Transmission Fluid Temperature Sensor "A" Circuit Short to Battery or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P071015**	**Transmission Fluid Temperature Sensor "A" Circuit Short to Battery or Open**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071015	The output voltage from the No. 1 ATF temperature sensor is higher than 4.915 V for 0.5 seconds or more and either condition is met (1 trip detection logic): (A) 10 minutes or more have elapsed after the engine start when the engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 seconds or more have elapsed after the engine start when the engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open or short in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM	P0713

MONITOR DESCRIPTION

The No. 1 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit. If the resistance value of the No. 1 ATF temperature sensor is higher than 156 kΩ*, the ECM interprets this as a fault in the No. 1 ATF temperature sensor or wiring. The ECM will illuminate the MIL and store the DTC.

*: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

MONITOR STRATEGY

Related DTCs	P0713: ATF temperature sensor/Range check (High voltage)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous

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Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not stored.	P0117, P0118 (ECT (Engine coolant temperature) sensor circuit fail) P0112, P0113 (IAT (Intake air temperature) sensor circuit fail)
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF
ECT (Engine coolant temperature) sensor circuit fail (P0117, P0118)	Not detected
IAT (Intake air temperature) sensor circuit fail (P0112, P0113)	Not detected

Either condition is met: Condition (A) or (B)

Condition (A):

Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	-29.375°C (-20.875°F) or less
Time after engine start	600 sec. or more

Condition (B):

Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	Higher than -29.375°C (-20.875°F)
Time after engine start	10 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

ATF temperature sensor voltage (ATF temperature)	Higher than 4.915 V (Below -48°C (-54°F))

COMPONENT OPERATING RANGE

ATF temperature sensor voltage (ATF temperature)	0.142 V or higher, and 4.915 V or less (-48°C (-54°F) or higher, and 164°C (327°F) or less)

WIRING DIAGRAM

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Refer to DTC P071011 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 10 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P0712 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P0713 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

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TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

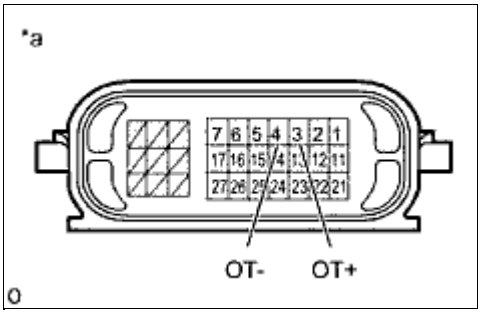
If the circuit related to the No. 1 ATF temperature sensor becomes open, P071015 is immediately stored (in 0.5 seconds). When P071015 is stored, P071000 cannot be stored.

It is not necessary to inspect the circuit when P071000 is stored.

PROCEDURE

1.	**INSPECT NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
3 (OT+) or 4 (OT-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 1 ATF TEMPERATURE SENSOR**

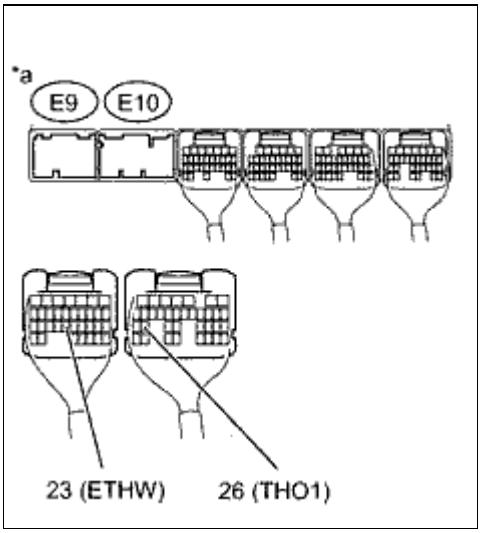
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(TRANSMISSION WIRE)

OK

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connectors.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-26 (THO1) - E9-23 (ETHW)	Always	79 Ω to 156 kΩ

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000025K005NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071512,P071514,P071531; Input/Turbine Speed Sensor "A" Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P071512**	**Input/Turbine Speed Sensor "A" Circuit Short to Battery**

DTC	**P071514**	**Input/Turbine Speed Sensor "A" Circuit Short to Ground or Open**

DTC	**P071531**	**Input/Turbine Speed Sensor "A" No Signal**

DESCRIPTION

This sensor detects the rotation speed of the turbine which shows the input turbine speed of the transmission. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071512	When the transmission revolution sensor (NT) input voltage is higher than 1.9 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM	P07C0
P071514	When the transmission revolution sensor (NT) input voltage is below 0.1 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM	P07BF
P071531	Both of the following conditions (A) and (B) are met for 5 seconds or more (1 trip detection logic): (A) Either of the following conditions (a) and (b) are met (a) All of the following conditions are met: • Output shaft speed is 1000 rpm or more. • Park/neutral position switch D input signal is ON. • Gear position is 2nd, 3rd, 4th, 5th or 6th. • The vehicle speed is 25 km/h (15.54 mph) or more. (b) All of the following conditions are met:	• Harness or connector • Transmission revolution sensor (NT) • ECM	P0717

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DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
	• Vehicle speed at output speed sensor is 8.99 km/h (5.59 mph) or more. • Park/neutral position switch D input signal is ON. • Either of the following conditions (aa) or (bb) is met (aa) Gear position is 1st and transmission revolution sensor (NT) is 1310 rpm or more (bb) Gear position is 2nd, 3rd, 4th, 5th or 6th and transmission revolution sensor (NT) is 760 rpm or more (B) Transmission revolution sensor (NT) value is less than 300 rpm.		

MONITOR DESCRIPTION

The transmission revolution sensor (NT) detects the transmission input shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

While the vehicle is operating in 2nd, 3rd, 4th, 5th or 6th gear with the shift lever in D, if the input shaft speed is less than 300 rpm*1 and the output shaft speed is more than 1000 rpm*2, the ECM interprets this as a fault, illuminates the MIL and stores the DTC.

*1: Pulse is not output or is irregularly output.

*2: The vehicle speed is 25 km/h (15.54 mph) or more.

MONITOR STRATEGY

Related DTCs	P07BF: Transmission revolution sensor (NT)/Range check (Low voltage) P07C0: Transmission revolution sensor (NT)/Range check (High voltage) P0717: Transmission revolution sensor (NT)/Verify pulse input
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P07BF and P07C0: 4.5 sec. P0717: 5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

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P07BF and P07C0:

Turbine speed sensor pulse input fail (P0717)	Not detected

P0717: Verify pulse input

Either condition is met: Condition (A) or (B)

Condition (A):

Output shaft revolution	1000 rpm or more
Vehicle speed	25 km/h (15.54 mph) or more
Shift change	Shift change is completed before starting next shift change operation
ECM selected gear	Not 1st
Park/neutral position switch (NSW)	OFF
R position switch	OFF
D position switch	ON
Engine	Running
Turbine speed sensor range check fail (P07BF, P07C0)	Not detected
Pressure Control Solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected

Condition (B):

Vehicle speed at output speed sensor	8.99 km/h (5.59 mph) or more
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
D position switch	ON
Park/neutral position switch (NSW)	OFF
Engine	Running
Pressure control solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more
2. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

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P07C0:

Turbine speed sensor voltage	Higher than 1.9 V

P07BF:

Turbine speed sensor voltage	Below 0.1 V

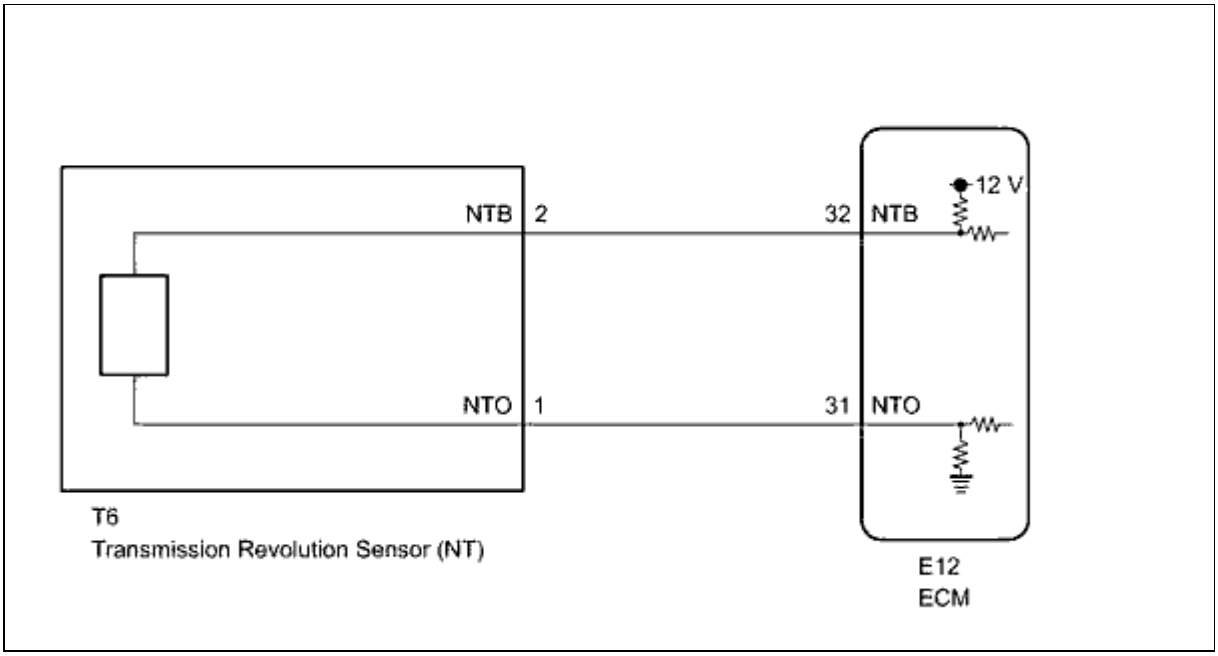
P0717 Condition (A) and (B):

Turbine speed sensor revolution	Less than 300 rpm

COMPONENT OPERATING RANGE

Transmission revolution sensor (NT)	Turbine speed is equal to engine speed with lock-up ON

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test and drive the vehicle for 5 seconds or more at 25 km/h (15.54 mph) or more INFO .
2. Check for DTCs again INFO .

1. DATA LIST

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HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
NT Sensor Speed	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm

HINT:

- NT Sensor Speed is always 0 while driving: Open or short in the sensor or circuit.
- NT Sensor Speed is always more than 0 and less than 300 rpm while driving the vehicle at 25 km/h (15.54 mph) or more: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (NT SENSOR SPEED AND NT SENSOR VOLTAGE)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Transmission

TESTER	MEASUREMENT	NORMAL CONDITION	DIAGNOSTIC NOTE

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DISPLAY	ITEM/RANGE		
NT Sensor Speed	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

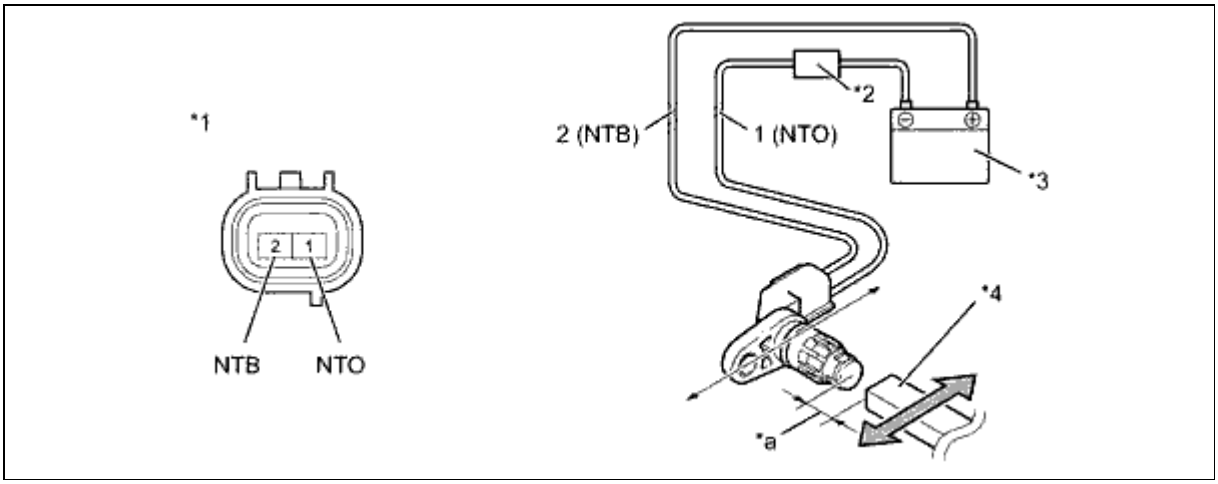
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (NT)**

(a) Remove the transmission revolution sensor (NT) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (NT)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (NT) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (NTO) - 2 (NTB)	Low signal	4 to 8 mA
1 (NTO) - 2 (NTB)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (NT)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (NT) - ECM)**

(a) Disconnect the T6 transmission revolution sensor (NT) connector.

(b) Disconnect the E12 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T6-2 (NTB) - E12-32 (NTB)	Always	Below 1 Ω
T6-1 (NTO) - E12-31 (NTO)	Always	Below 1 Ω
T6-2 (NTB) - Body ground	Always	10 kΩ or higher
T6-1 (NTO) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000003UR2020X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P072012,P072014,P072031; Output Speed Sensor Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P072012**	**Output Speed Sensor Circuit Short to Battery**

DTC	**P072014**	**Output Speed Sensor Circuit Short to Ground or Open**

DTC	**P072031**	**Output Speed Sensor No Signal**

DESCRIPTION

This sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P072012	When the transmission revolution sensor (SP2) input voltage is higher than 1.9 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2) • ECM	P077D
P072014	When the transmission revolution sensor (SP2) input voltage is below 0.1 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2) • ECM	P077C
P072031	All conditions are met for 5 seconds or more (1 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Either condition is met. • Gear position is 1st: Transmission revolution sensor (NT) value is 1310 rpm or more. • Gear position is 2nd, 3rd, 4th, 5th or 6th: Transmission revolution sensor (NT) value is more than 760 rpm or more. (c) The vehicle speed is 8.99 km/h (5.6 mph) or more. (d) No signal from transmission revolution sensor (SP2) is	• Harness or connector • Transmission revolution sensor (SP2) • ECM	P0722

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DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
	input to the ECM.		

MONITOR DESCRIPTION

The transmission revolution sensor (SP2) detects the transmission output shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

If the ECM detects no signal from the transmission revolution sensor (SP2) even while the vehicle is moving, it will conclude that there is a malfunction in the transmission revolution sensor (SP2). The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0722: Transmission revolution sensor (SP2)/Verify pulse input P077C: Transmission revolution sensor (SP2)/Range check (Low voltage) P077D: Transmission revolution sensor (SP2)/Range check (High voltage)
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P0722: 5 sec. P077C, P077D: 4.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

P0722:

Vehicle speed	8.99 km/h (5.59 mph) or more
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
D position switch	ON
Park/neutral position switch (NSW)	OFF
Engine	Running
Output speed sensor range check fail (P077C, P077D)	Not detected

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Pressure control solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more
2. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more

P077C and P077D:

Output speed sensor pulse input fail (P0722)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0722:

Output shaft speed sensor signal	No signal

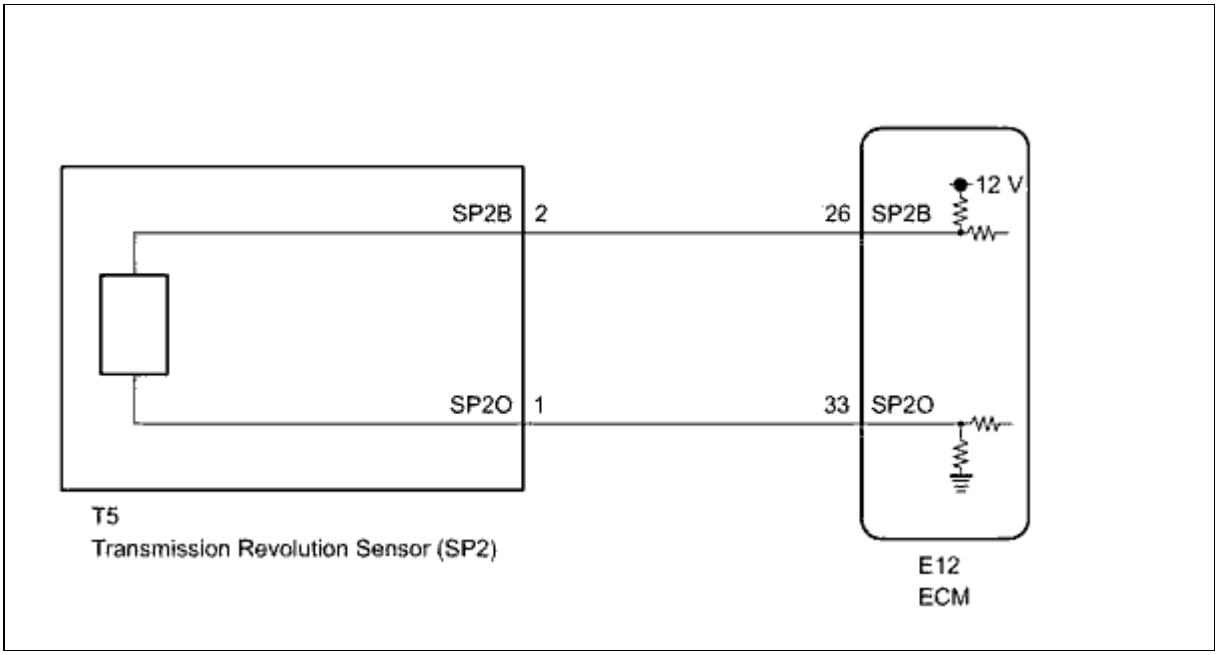
P077C:

Intermediate shaft speed sensor voltage	Below 0.1 V

P077D:

Intermediate shaft speed sensor voltage	Higher than 1.9 V

WIRING DIAGRAM



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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Speed (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-

HINT:

- Speed (SP2) is always 0 while driving: Open or short in the sensor or circuit.
- Speed (SP2) value displayed on the Techstream is much lower than the actual vehicle speed: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPEED (SP2) AND SP2 SENSOR VOLTAGE)**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Speed (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-
SP2 Sensor Voltage	Transmission revolution sensor (SP2) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

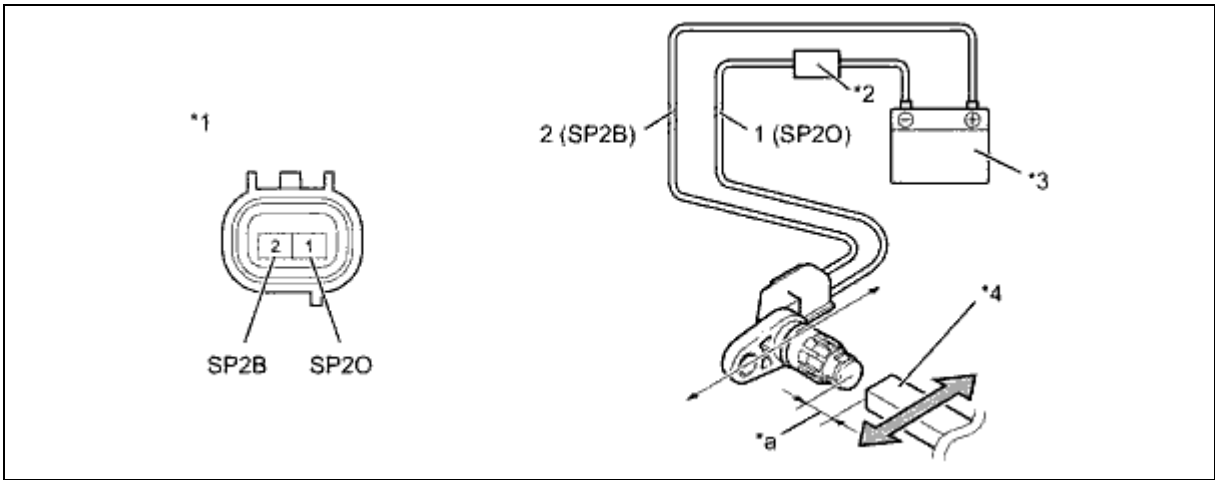
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (SP2)**

(a) Remove the transmission revolution sensor (SP2) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (SP2)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (SP2) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SP2O) - 2 (SP2B)	Low signal	4 to 8 mA
1 (SP2O) - 2 (SP2B)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (SP2)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (SP2) - ECM)**

(a) Disconnect the T5 transmission revolution sensor (SP2) connector.

(b) Disconnect the E12 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T5-2 (SP2B) - E12-26 (SP2B)	Always	Below 1 Ω
T5-1 (SP2O) - E12-33 (SP2O)	Always	Below 1 Ω
T5-2 (SP2B) - Body ground	Always	10 kΩ or higher
T5-1 (SP2O) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001IYS05YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P074011; Torque Converter Clutch Circuit Short to Ground; 2016 MY Tacoma [08/2015 -]		

DTC	**P074011**	**Torque Converter Clutch Circuit Short to Ground**

DESCRIPTION

Shift solenoid valve SL is turned on and off by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P074011	The shift solenoid valve SL terminal voltage level is low, when the shift solenoid valve SL is operated (2 trip detection logic).	• Short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	P2769

Fail-safe function:

If the ECM detects a malfunction, it turns shift solenoid valve SL off.

MONITOR DESCRIPTION

Based on the signals from the throttle position sensor, the air flow meter and the crankshaft position sensor, the ECM sends a signal to shift solenoid valve SL to regulate the hydraulic pressure and provide smoother torque converter engagement. Shift solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform the torque-converter lock-up function. If the ECM detects a in the shift solenoid valve SL circuit, it will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2769: Shift solenoid valve SL/Range check
Required sensors/Components	Shift solenoid valve SL
Frequency of operation	Continuous
Duration	1 time
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None

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Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
Command to shift solenoid valve SL	ON
Time after command to solenoid OFF to ON	More than 0.008192 sec.

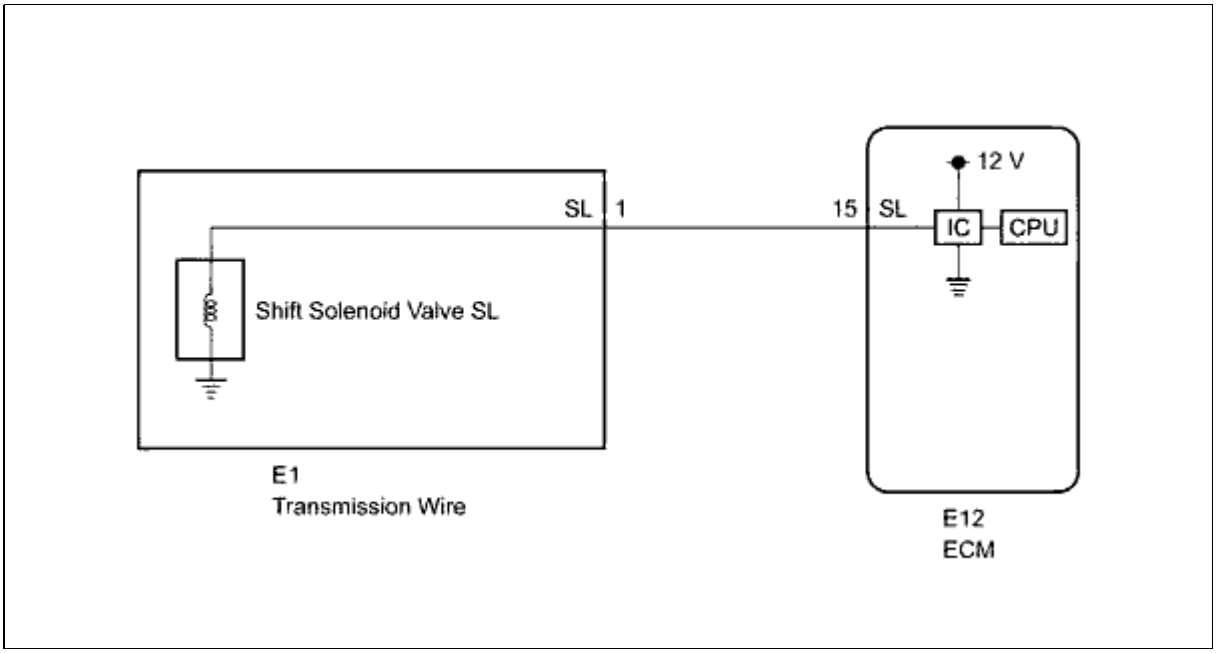
TYPICAL MALFUNCTION THRESHOLDS

Solenoid terminal voltage level	Low

COMPONENT OPERATING RANGE

Solenoid terminal voltage level	High

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

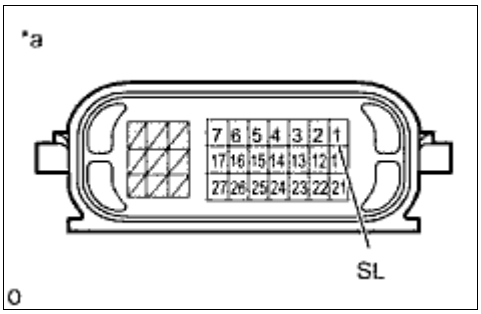
1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

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PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Component without harness connected (Transmission Wire)

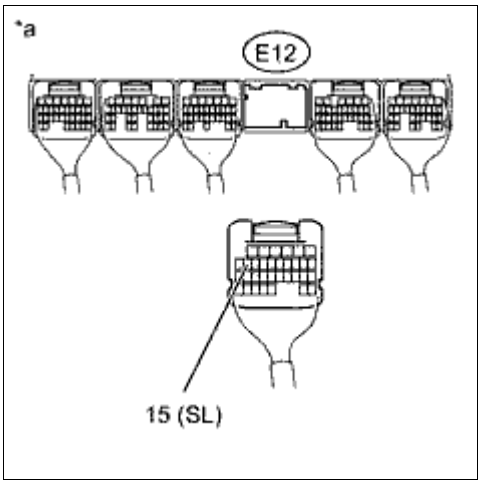
NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-15 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

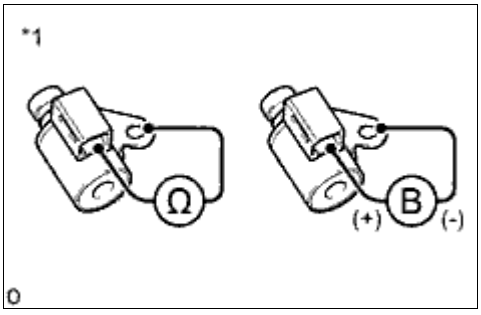
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL**

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

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(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001IYS05ZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P074015; Torque Converter Clutch Circuit Short to Battery or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P074015**	**Torque Converter Clutch Circuit Short to Battery or Open**

DESCRIPTION

Shift solenoid valve SL is turned on and off by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P074015	The shift solenoid valve SL terminal voltage level is high, when the shift solenoid valve SL is not operated (2 trip detection logic).	• Open or short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	P2770

Fail-safe function:

If the ECM detects a malfunction, it turns shift solenoid valve SL off.

MONITOR DESCRIPTION

Based on the signals from the throttle position sensor, the air flow meter and the crankshaft position sensor, the ECM sends a signal to shift solenoid valve SL to regulate the hydraulic pressure and provide smoother torque converter engagement. Shift solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform the torque-converter lock-up function. If the ECM detects an open or short in the shift solenoid valve SL circuit, it will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2770: Shift solenoid valve SL/Range check
Required sensors/Components	Shift solenoid valve SL
Frequency of operation	Continuous
Duration	1 time
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON

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Starter	OFF
Command to shift solenoid valve SL	OFF
Time after command to solenoid OFF to ON	More than 0.008192 sec.

TYPICAL MALFUNCTION THRESHOLDS

Solenoid terminal voltage level	High

COMPONENT OPERATING RANGE

Solenoid terminal voltage level	Low

WIRING DIAGRAM

Refer to DTC P074011 INFO

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

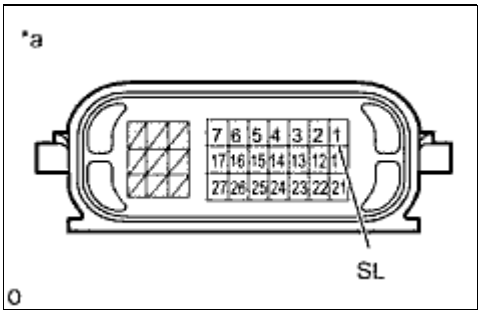
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

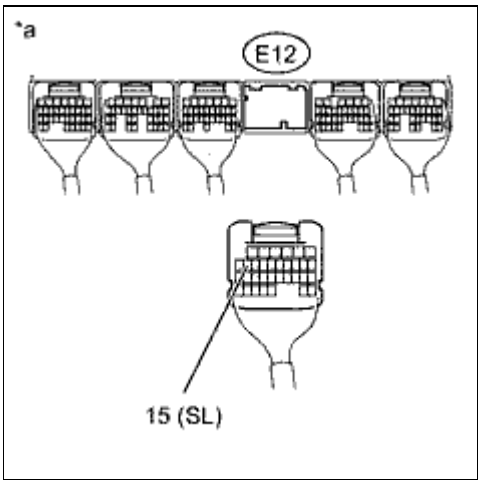
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-15 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

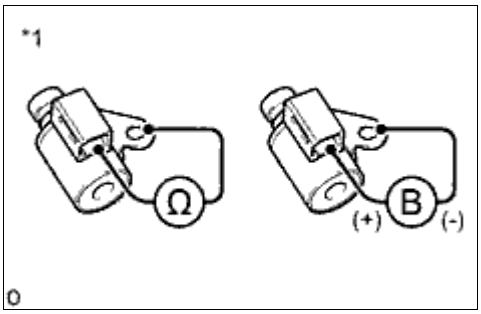
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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3.	INSPECT SHIFT SOLENOID VALVE SL

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000027R705VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07407F; Torque Converter Clutch Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07407F**	**Torque Converter Clutch Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses signals from the throttle position sensor, mass air flow meter, transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor to help determine the engagement timing of the lock-up clutch. The ECM monitors the engagement of the clutch using the transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SL, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07407F	Lock-up does not occur when requested (2 trip detection logic).	• Shift solenoid valve SL remains closed • Transmission wire • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear etc.) • Line pressure is too low	P0741

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature, and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SL. When shift solenoid valve SL is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SL or lock-up system performance. The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)

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- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P0741: Shift solenoid valve SL OFF malfunction
Required sensors/Components	Shift solenoid valve SL, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE), Throttle position sensor (VPA1), Mass air flow meter (MAF), ATF temperature sensor (THO1), Engine coolant temperature sensor (ECT)
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction

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Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

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| Engine Speed - Turbine speed |	70 rpm or more

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up Solenoid	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more

HINT:

This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

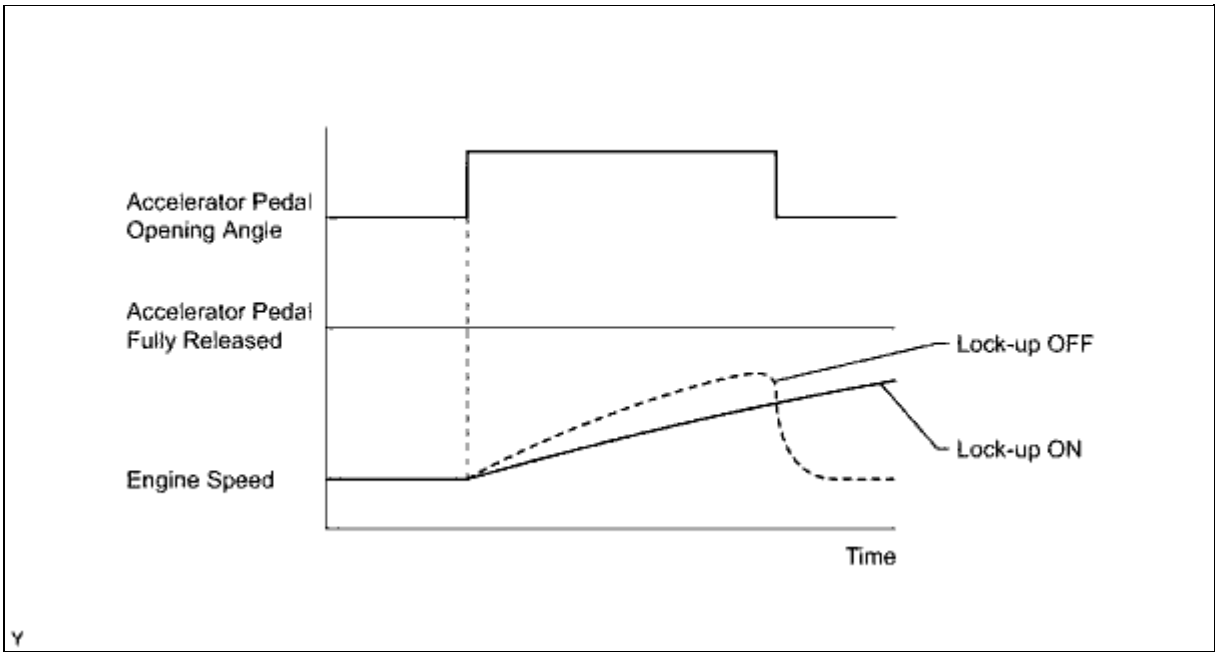
(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully

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releasing the pedal will close the throttle valve and lock-up may be turned off.)



PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07407F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07407F is output	A
P0741 and other DTCs are output	B

HINT:

If any other codes besides P07407F are output, perform the troubleshooting for those DTCs first.

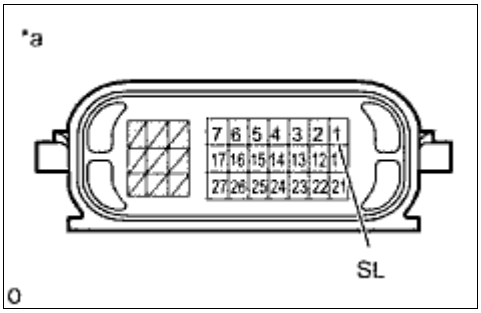
B ▶ **GO TO DTC CHART**

A ▼

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2.	INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

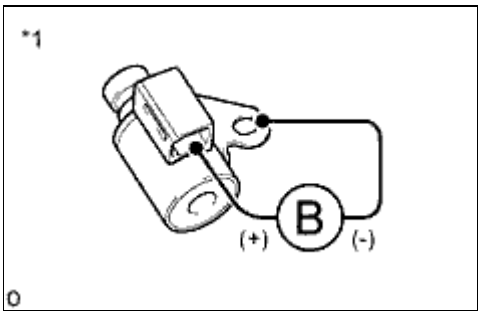
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 6**

OK ▼

3.	INSPECT SHIFT SOLENOID VALVE SL (OPERATION)

(a) Remove shift solenoid valve SL INFO .



(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION

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MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

5.	**INSPECT TORQUE CONVERTER ASSEMBLY**

(a) Check the torque converter assembly INFO .

OK:

The torque converter operates normally.

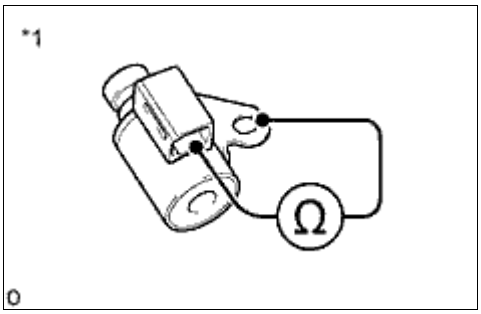
NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

6.	**INSPECT SHIFT SOLENOID VALVE SL (RESISTANCE)**

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(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8F0LJX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P074513; Pressure Control Solenoid "A" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P074513**	**Pressure Control Solenoid "A" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P074513	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL1 circuit while driving and shifting gears (SL1 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL1 circuit • Shift solenoid valve SL1 • ECM	P0748

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL1 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL1 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0748: Shift solenoid valve SL1/Range check
Required sensors/Components	Shift solenoid valve SL1
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

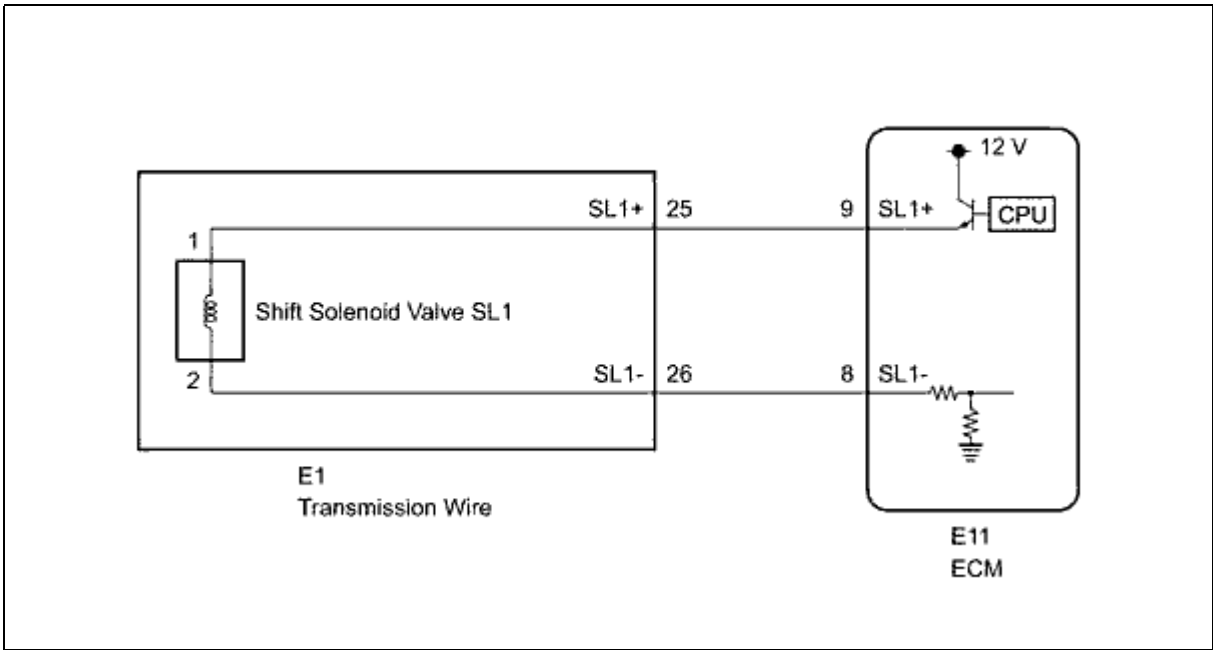
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL1 when the shift lever is in D:

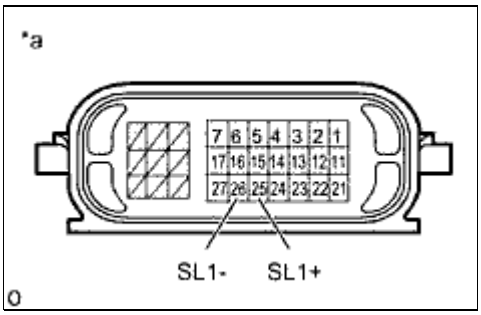
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL1)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
25 (SL1+) - 26 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
25 (SL1+) - Body ground	Always	10 kΩ or higher
26 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

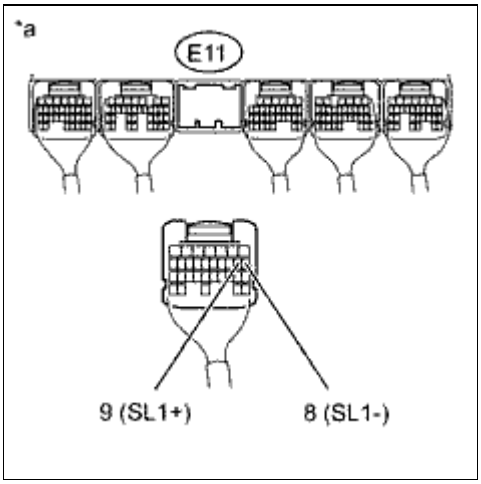
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E11-9 (SL1+) - E11-8 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
E11-9 (SL1+) - Body ground	Always	10 kΩ or higher
E11-8 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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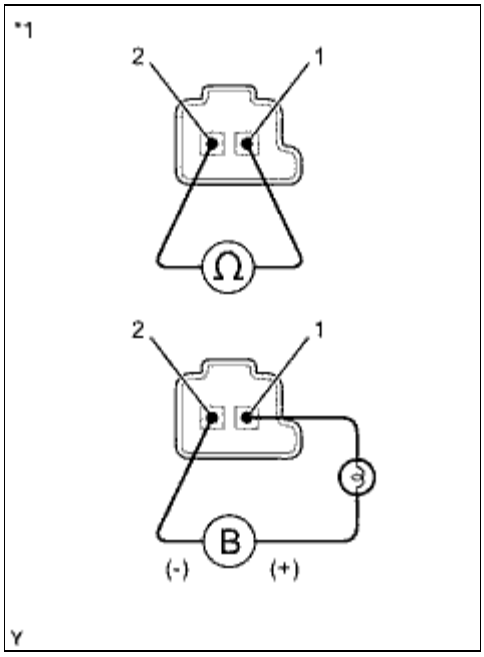
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL1

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL1

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VT08MX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07457F; Pressure Control Solenoid "A" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07457F**	**Pressure Control Solenoid "A" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07457F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 1st, 2nd, 3rd or 4th gear is commanded. • Either condition is met twice: ○ When a shift to 5th gear is commanded, 4th gear is engaged. ○ When a shift to 6th gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL1 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)	P0746

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0746: Shift solenoid valve SL1 OFF malfunction Shift solenoid valve SL1 ON malfunction
Required sensors/Components	Shift solenoid valve SL1, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.

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MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

OFF malfunction:

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ECM selected gear	1st, 2nd, 3rd or 4th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction:

ECM selected gear	5th or 6th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

[ON malfunction]

2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07457F)**

(a) Connect the Techstream to the DLC3.

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(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07457F is output	A
P07457F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ GO TO STEP 3

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the	Operates the shift solenoid	1st/2nd	Can be used to check the operation of the shift

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Shift Position	valves to allow gears to be selected manually.	/3rd/4th /5th/6th Start/Stop	solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P07957F)**

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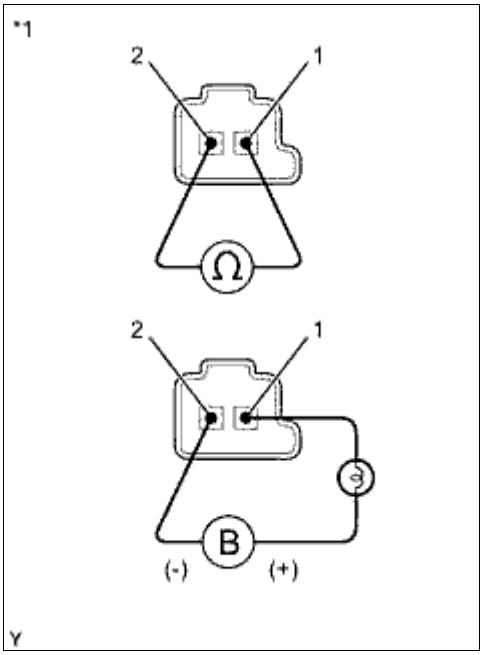
D GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)

E GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P27137F)

A

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

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Text in Illustration

*1	Shift Solenoid Valve SL1

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL1**

OK
▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:
There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8G0KAX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P077513; Pressure Control Solenoid "B" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P077513**	**Pressure Control Solenoid "B" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P077513	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL2 circuit while driving and shifting gears (SL2 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL2 circuit • Shift solenoid valve SL2 • ECM	P0778

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL2 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL2 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0778: Shift solenoid valve SL2/Range check
Required sensors/Components	Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

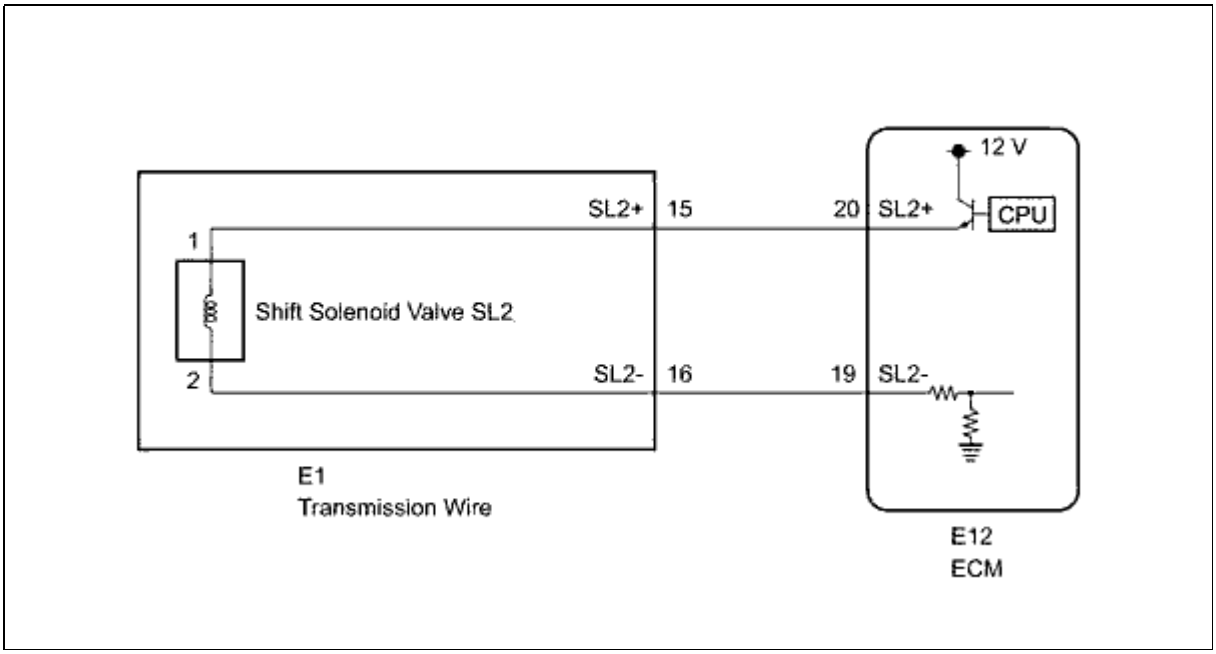
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL2 when the shift lever is in D:

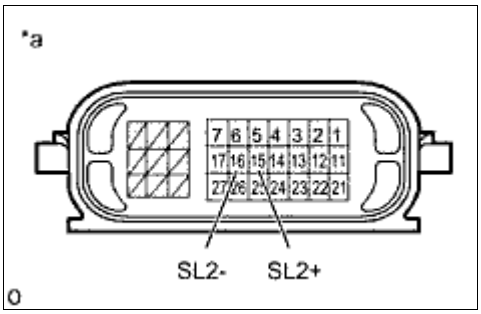
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test.
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL2)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
15 (SL2+) - 16 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
15 (SL2+) - Body ground	Always	10 kΩ or higher
16 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

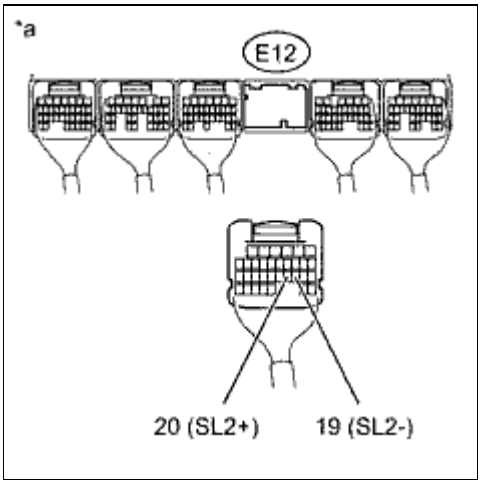
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-20 (SL2+) - E12-19 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
E12-20 (SL2+) - Body ground	Always	10 kΩ or higher
E12-19 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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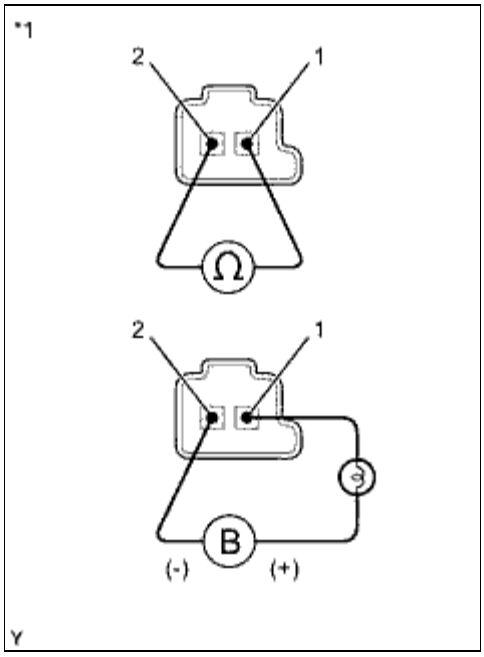
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL2

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VU08WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07757F; Pressure Control Solenoid "B" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07757F**	**Pressure Control Solenoid "B" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07757F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 4th, 5th or 6th gear is commanded. • One of the following conditions is met twice: ○ When a shift to 1st gear is commanded, 4th gear is engaged. ○ When a shift to 2nd gear is commanded, 4th gear is engaged. ○ When a shift to 3rd gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL2 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)	P0776

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0776: Shift solenoid valve SL2/OFF malfunction Shift solenoid valve SL2/ON malfunction
Required sensors/Components	Shift solenoid valve SL2, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)

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Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more

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TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

OFF malfunction:

ECM selected gear	4th, 5th or 6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction (A):

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (B):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (C):

ECM selected gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

[ON malfunction]

One of the following conditions is met: ON malfunction (A), (B) or (C)
2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

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ON malfunction (A), (B) or (C):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07757F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07757F is output	A
P07757F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

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NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	

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ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO STEP 3**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P07957F)**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)**

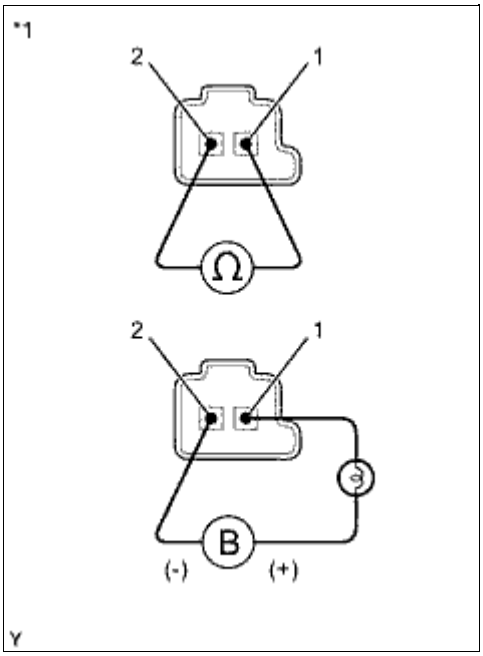
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P27137F)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P07457F)**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

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(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL2**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015W808MX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P079513; Pressure Control Solenoid "C" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P079513**	**Pressure Control Solenoid "C" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P079513	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL3 circuit while driving and shifting gears (SL3 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL3 circuit • Shift solenoid valve SL3 • ECM	P0798

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL3 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL3 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0798: Shift solenoid valve SL3/Range check
Required sensors/Components	Shift solenoid valve SL3
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

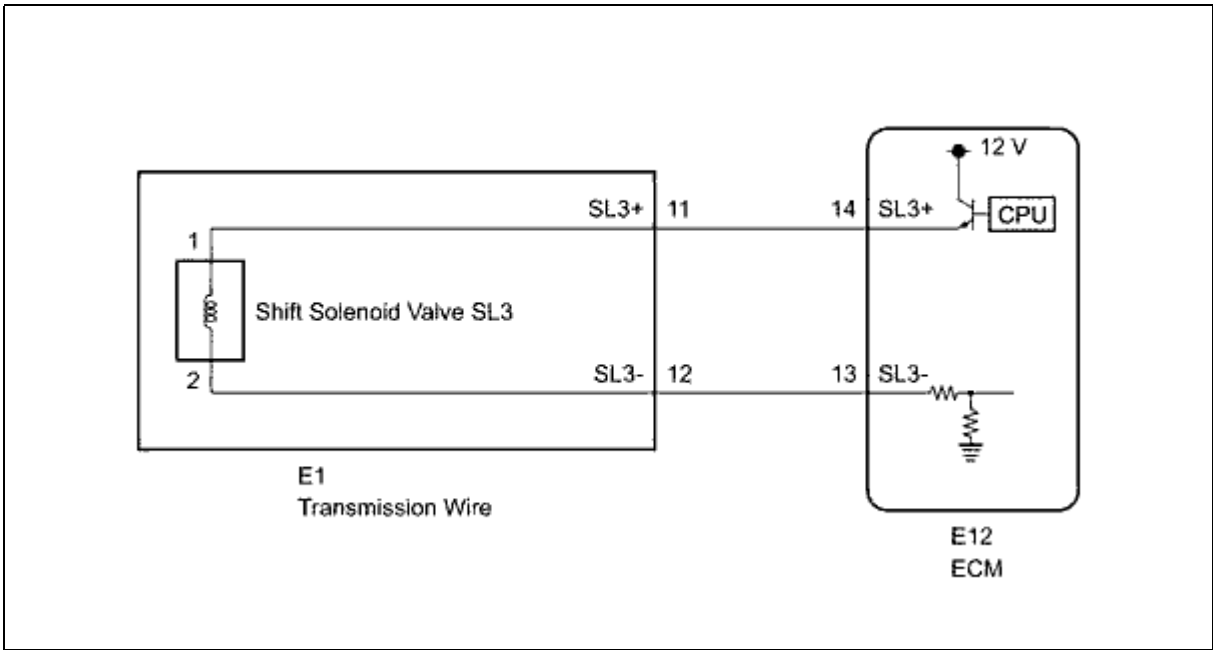
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL3 when the shift lever is in D:

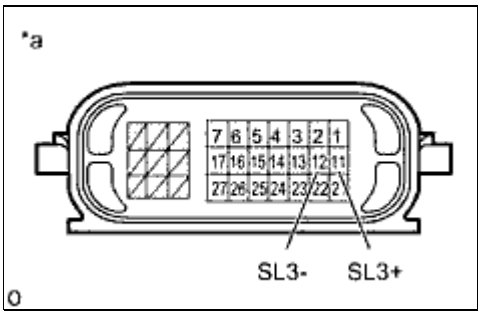
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL3)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
11 (SL3+) - 12 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
11 (SL3+) - Body ground	Always	10 kΩ or higher
12 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

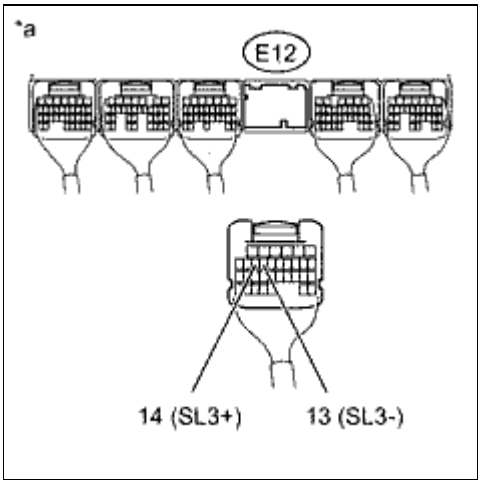
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-14 (SL3+) - E12-13 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
E12-14 (SL3+) - Body ground	Always	10 kΩ or higher
E12-13 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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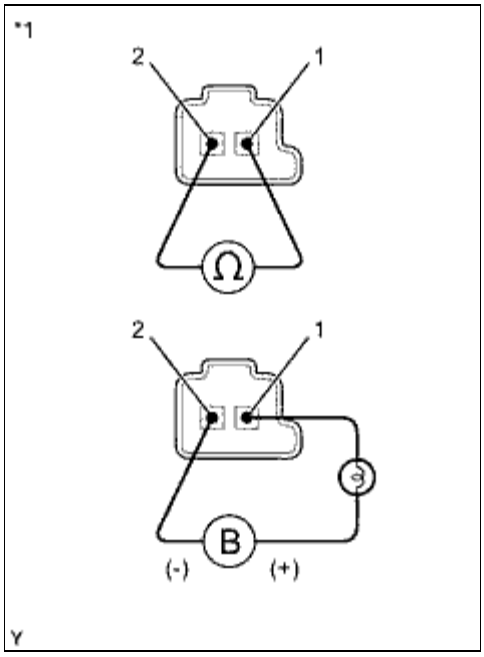
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL3**

(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL3

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VV08UX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07957F; Pressure Control Solenoid "C" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07957F**	**Pressure Control Solenoid "C" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07957F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 2nd or 6th gear is commanded. • The following condition is met twice: When a shift to 1st gear is commanded, 2nd gear is engaged.	• Shift solenoid valve SL3 remains open or closed. • Transmission valve body assembly is blocked. • Automatic transmission assembly (clutch, brake or gear etc.)	P0796

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0796: Shift solenoid valve SL3/OFF malfunction Shift solenoid valve SL3/ON malfunction
Required sensors/Components	Shift solenoid valve SL3, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C) and (D): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

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TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

OFF malfunction (A):

ECM selected gear	2nd
Throttle valve opening angle	3% or more

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ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (B):

ECM selected gear	6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (C):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle: (When condition "D" is not detected)	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
Throttle valve opening angle: (When condition "D" is detected)	0% or more at output speed 900 rpm (Condition varies with output speed)
ECT (engine coolant temperature)	40°C (104°F) or higher

OFF malfunction (D):

Throttle valve opening angle	0% or more at output speed 900 rpm (Condition varies with output speed)

ON malfunction:

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or ((C) and (D))

OFF malfunction (A):

Turbine speed - Output speed x 2nd gear ratio	1000 rpm or more

OFF malfunction (B):

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Turbine speed - Output speed x 6th gear ratio	1000 rpm or more

OFF malfunction (C) and (D):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.3

[ON malfunction]

2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	1.95 to 2.4

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07957F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07957F is output	A
P07957F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

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A GO TO STEP 3

B

2.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

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(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO STEP 3**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)**

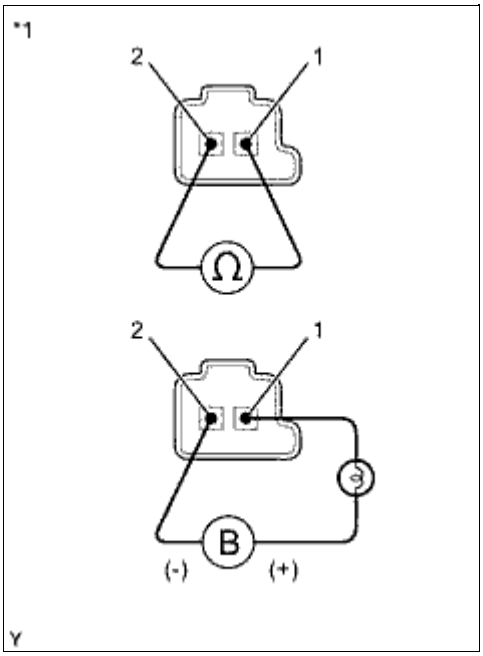
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P27137F)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P07457F)**

3.	**INSPECT SHIFT SOLENOID VALVE SL3**

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(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL3**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8A0OTX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P271313; Pressure Control Solenoid "D" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P271313**	**Pressure Control Solenoid "D" Circuit Open**

DESCRIPTION

Refer to the system description for DTC P27137F INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P271313	Open or short is detected in shift solenoid valve SLT circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM	P2716

MONITOR DESCRIPTION

When an open or short in the shift solenoid valve SLT circuit is detected, the ECM interprets this as a fault. The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2716: Shift solenoid valve SLT/Range check
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

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Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

Condition (D):

Battery voltage	11 V or higher
Target current	0.2 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B), (C) or (D)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

Output duty cycle	Less than 0%

Condition (D):

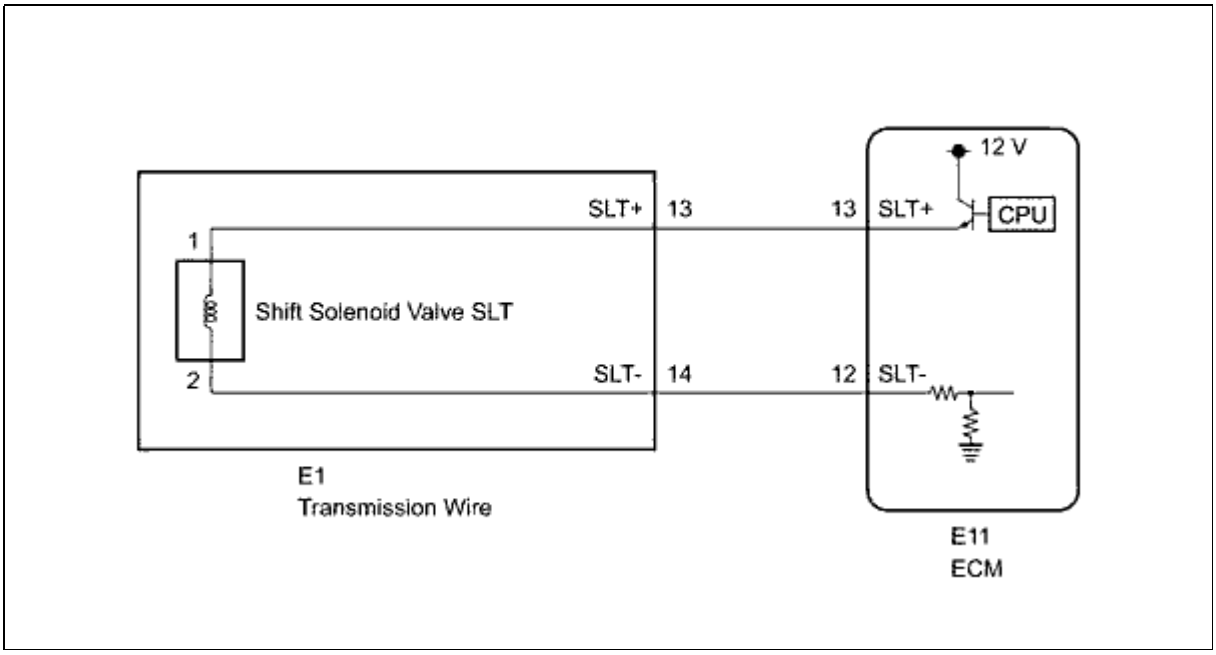
Solenoid voltage monitor	No signal

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%
Solenoid voltage monitor	Signal input

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

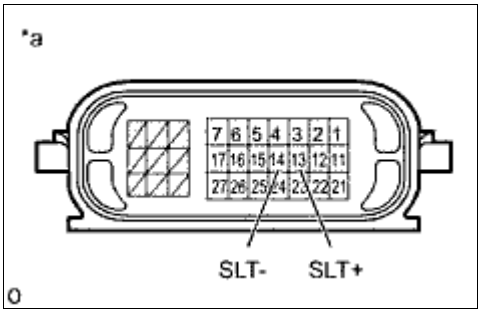
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLT)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
13 (SLT+) - 14 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
13 (SLT+) - Body ground	Always	10 kΩ or higher
14 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

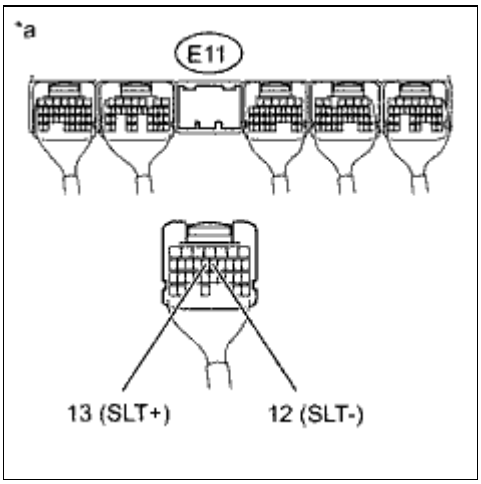
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK
▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E11-13 (SLT+) - E11-12 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
E11-13 (SLT+) - Body ground	Always	10 kΩ or higher
E11-12 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

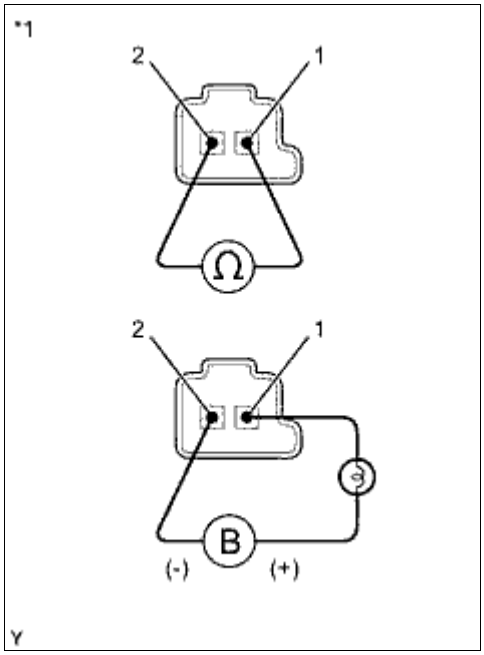
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NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE ECM

3.	**INSPECT SHIFT SOLENOID VALVE SLT**

(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLT

NG ▶ REPLACE SHIFT SOLENOID VALVE SLT

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OK ▶ REPLACE TRANSMISSION WIRE

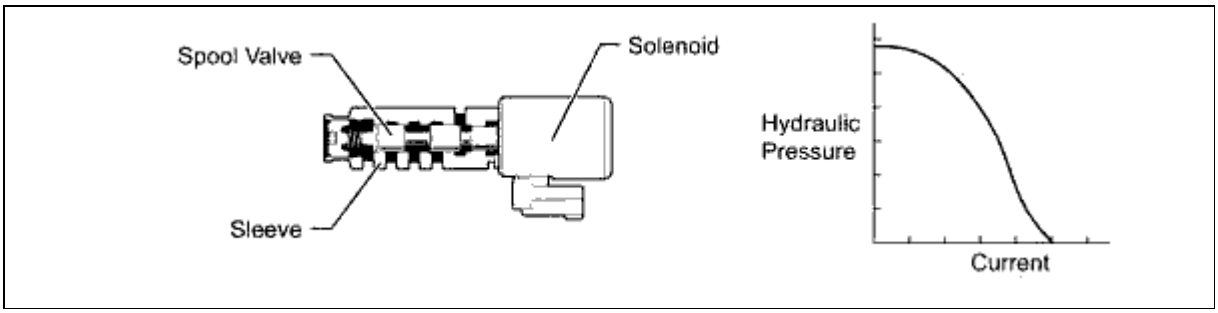
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W830Q3X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P27137F; Pressure Control Solenoid "D" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P27137F**	**Pressure Control Solenoid "D" Actuator Stuck Off**

SYSTEM DESCRIPTION

The shift solenoid valve SLT controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the current to shift solenoid valve SLT to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P27137F	The ECM detects a malfunction in the shift solenoid valve SLT (ON side) according to the difference in the speed between the turbine and the output shaft, and also by the ATF pressure. (2 trip detection logic)	• Shift solenoid valve SLT remains open • Shift solenoid valve SL1, SL2, SL3 or SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear, etc.)	P2714

MONITOR DESCRIPTION

The ECM calculates the amount of clutch slip based on the input turbine speed, output shaft speed, and gear ratio. If the amount of clutch slip exceeds a specified level, the ECM will set this DTC and illuminate the MIL.

When shift solenoid valve SLT remains on, the line pressure goes down and clutch engagement force decreases.

NOTICE:

If the vehicle continues to be driven under these conditions, the clutch will burn up and the vehicle will no longer be drivable.

MONITOR STRATEGY

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Related DTCs	P2714: Shift solenoid valve SLT/ON malfunction
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	ON malfunction: 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ON malfunction:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2716 (Shift solenoid valve SLT circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLT circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: ON malfunction (A), (B), (C), (D), (E), (F) or (G)

ON malfunction (A):

Summation of clutch heat generations	Specified value

ON malfunction (B):

Shift solenoid valve SL1 ON malfunction	Detected

ON malfunction (C):

Shift solenoid valve SL1 OFF malfunction	Detected

ON malfunction (D):

Shift solenoid valve SL2 OFF malfunction	Detected

ON malfunction (E):

Shift solenoid valve SL3 OFF malfunction	Detected

ON malfunction (F):

Shift solenoid valve SL4 ON malfunction	Detected

ON malfunction (G):

Shift solenoid valve SL4 OFF malfunction	Detected

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.

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4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P27137F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P27137F is output	A
P27137F and other DTCs are output	B

HINT:

If a solenoid is stuck on, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 4**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE SOLENOID (SLT))**

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.
- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.

HINT:

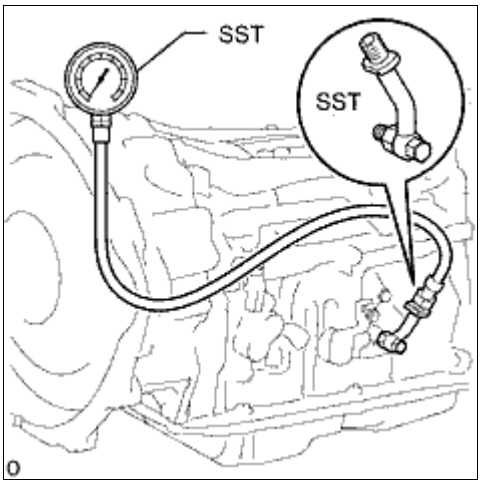
Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Turn the ignition switch off.

(b) Lift the vehicle up.

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(c) Remove the test plug from the transmission case and connect SST.



SST: 09993-19015

09993-00010

09993-00040

(d) Lower the vehicle.

(e) Fully apply the parking brake and chock the 4 wheels.

(f) Connect the Techstream to the DLC3.

(g) Start the engine.

(h) Warm up the ATF (Automatic Transmission Fluid).

(i) Measure the line pressure when the engine is idling.

(j) Turn the Techstream on.

(k) Enter the following menus: Powertrain / Transmission / Active Test.

(l) Follow the instructions on the Techstream and perform the Active Test.

(m) Measure the line pressure with SST.

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Solenoid (SLT)*	Operates shift solenoid valve SLT to raise the line pressure.	ON/OFF **HINT:** ON: No action (normal operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid (SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	[Vehicle Condition] • Vehicle Stopped • Engine idling

*: The "Activate the solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

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Note that the pressure readings for the Active Test and Hydraulic Test are different.

OK:

The line pressure changes as specified when performing the Active Test.

NG ▶ **GO TO STEP 4**

OK ▼

3.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.

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- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P07957F)**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)**

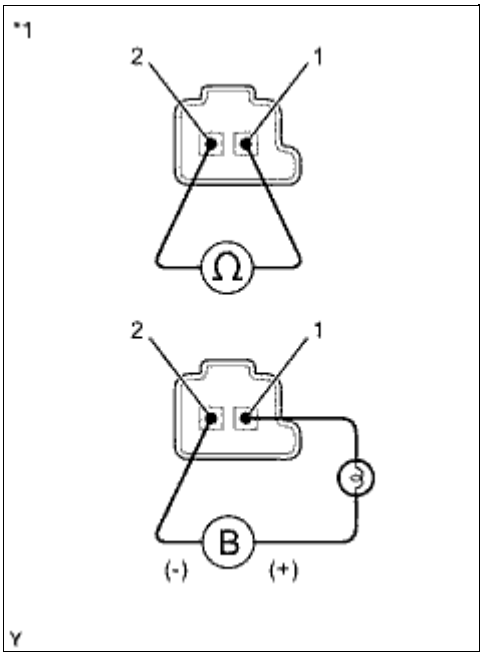
E ▶ **GO TO STEP 4**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)**

4.	**INSPECT SHIFT SOLENOID VALVE SLT**

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(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLT

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLT**

OK ▼

5.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000012XR0AUX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P274011; Transmission Fluid Temperature Sensor "B" Circuit Short to Ground; 2016 MY Tacoma [08/2015 -]		

DTC	**P274011**	**Transmission Fluid Temperature Sensor "B" Circuit Short to Ground**

DESCRIPTION

The No. 2 ATF temperature sensor is installed in the transmission valve body assembly.

If the ECM detects an abnormally high ATF temperature near this sensor, it illuminates the warning indicator.

HINT:

- The temperature of ATF easily rises when towing, climbing hills, in traffic, etc.
- If the No. 2 ATF temperature sensor becomes short-circuited, the signal that indicates that the ATF temperature is 150°C (302°F) or higher is input into the ECM.

Vehicle conditions when the sensor is normal and when the sensor is short-circuited are indicated in the table below.

NO. 2 ATF TEMPERATURE SENSOR STATE	DETECTION CONDITION	SYMPTOM	RECOVERY CONDITION
Sensor is normal	ATF temperature higher than 150°C (302°F)	ATF temperature warning indicator remains on	ATF temperature below 135°C (275°F)*1
	ATF temperature higher than 130°C (266°F)	Shift point too high	ATF temperature below 110°C (230°F)
Sensor is short-circuited	Any conditions	Shift point too high	Symptoms still occur
	Engine coolant temperature higher than 95°C (203°F)	Lock-up at 3rd gear*2	Symptoms still occur

HINT:

*1: When ATF temperature is in the normal range, it decreases to below 135°C (275°F) within 5 minutes with the shift lever in P or N in an idling state.

*2: When ATF temperature is normal, transmission lock-up occurs in 4th, 5th and 6th gear with the shift lever in D or with the S6 range selected, in 4th or 5th gear with the S5 range selected, and 4th gear with the S4 range selected.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P274011	The output voltage from the No. 2 ATF temperature sensor is below 0.0459 V for 0.5 seconds or more (1 trip detection logic).	• Short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor (transmission wire) • ECM	P2742

MONITOR DESCRIPTION

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The No. 2 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects a short in the No. 2 ATF temperature sensor circuit. If the resistance value of the No. 2 ATF temperature sensor is below 25 Ω*, the ECM interprets this as a fault in the No. 2 ATF temperature sensor or wiring. The ECM stores the DTC.

*: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

WIRING DIAGRAM

Refer to DTC P071011 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 3 seconds or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 2	No. 2 ATF temperature sensor value/	• Approx. 80°C (176°F): After stall	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: -40°C (-40°F) Max.: 150°C (302°F)	test • Equal to ambient temperature when cold soak	

HINT:

- When DTC P274011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.
- When DTC P274015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

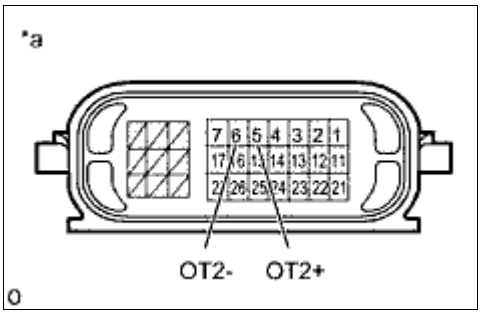
Check the temperature displayed on the Techstream in order to check if a malfunction exists.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

PROCEDURE

1.	**INSPECT NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
5 (OT2+) - Body ground	Always	10 kΩ or higher
6 (OT2-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ

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25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

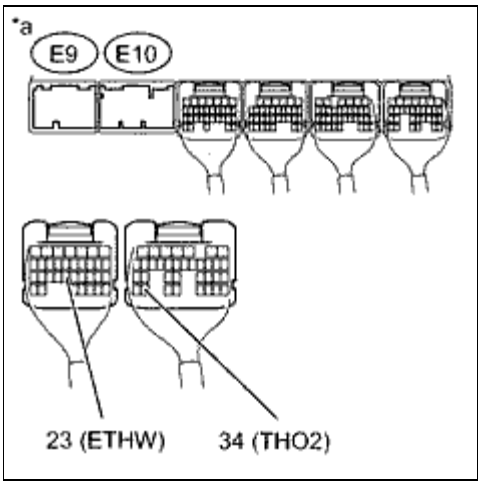
*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connectors.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-34 (THO2) - E9-23 (ETHW)	Always	25 Ω to 156 kΩ
E10-34 (THO2) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

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OK ▶ REPLACE ECM

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000012XR0AVX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P274015; Transmission Fluid Temperature Sensor "B" Circuit Short to Battery or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P274015**	**Transmission Fluid Temperature Sensor "B" Circuit Short to Battery or Open**

DESCRIPTION

The No. 2 ATF temperature sensor is installed in the transmission valve body assembly.

If the ECM detects an abnormally high ATF temperature near this sensor, it illuminates the warning indicator.

HINT:

The temperature of ATF easily rises when towing, climbing hills, in traffic, etc.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P274015	The output voltage from the No. 2 ATF temperature sensor is higher than 4.915 V for 0.5 seconds or more and either condition is met (1 trip detection logic): (A) 15 minutes or more have elapsed after the engine start when the engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 seconds or more have elapsed after the engine start when the engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open or short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor (transmission wire) • ECM	P2743

MONITOR DESCRIPTION

The No. 2 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 2 ATF temperature sensor circuit. If the resistance value of the No. 2 ATF temperature sensor is higher than 156 kΩ*, the ECM interprets this as a fault in the No. 2 ATF temperature sensor or wiring. The ECM stores the DTC.

*: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

WIRING DIAGRAM

Refer to DTC P071011 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

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HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 15 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.

HINT:

- When DTC P274011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.
- When DTC P274015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

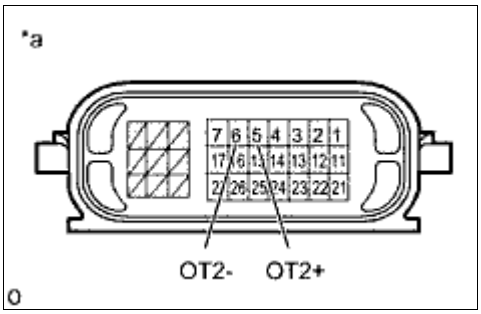
TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

PROCEDURE

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1.	**INSPECT NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
5 (OT2+) - Body ground	Always	10 kΩ or higher
6 (OT2-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

*a	Component without harness connected (Transmission Wire)

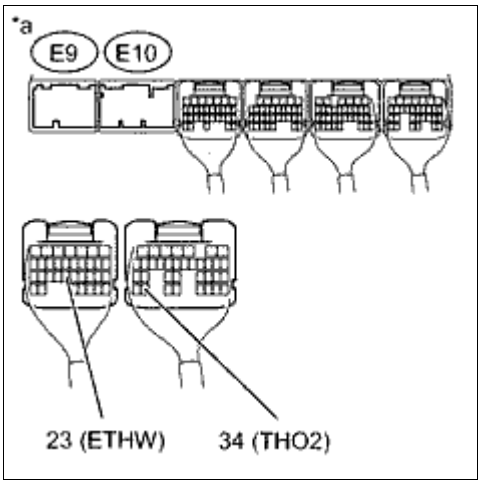
NG ▶ **REPLACE NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-34 (THO2) - E9-23 (ETHW)	Always	25 Ω to 156 kΩ

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W890MBX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P275613; Torque Converter Clutch Pressure Control Solenoid Control Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P275613**	**Torque Converter Clutch Pressure Control Solenoid Control Circuit Open**

DESCRIPTION

Refer to the system description for DTC P27567F INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P275613	Open or short is detected in shift solenoid valve SLU circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLU circuit • Shift solenoid valve SLU • ECM	P2759

MONITOR DESCRIPTION

When an open or short in a shift solenoid valve SLU circuit is detected, the ECM determines there is a malfunction. The ECM will illuminate the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P2759: Shift solenoid valve SLU/Range check
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

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Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

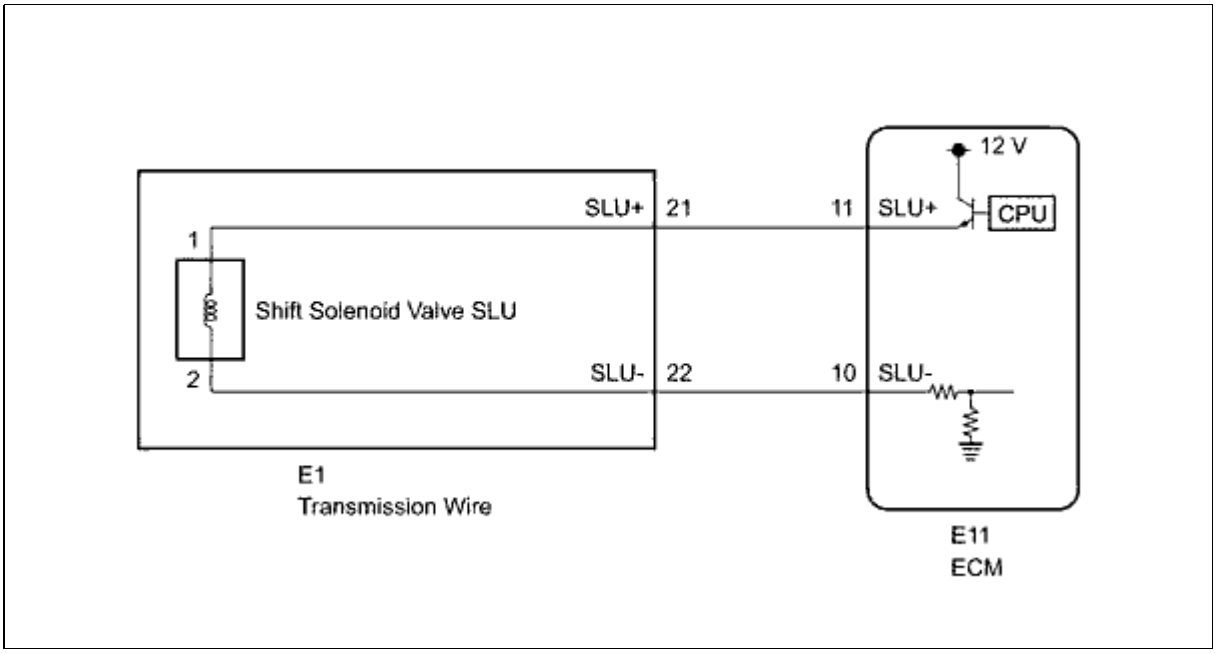
Condition (C):

Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

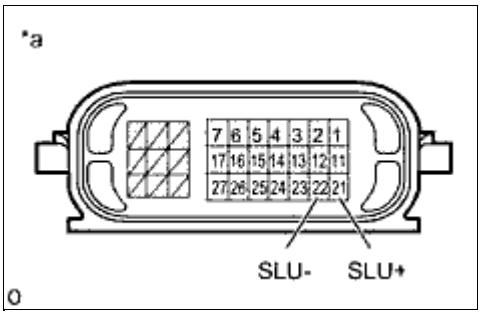
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLU)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
21 (SLU+) - 22 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
21 (SLU+) - Body ground	Always	10 kΩ or higher
22 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Transmission Wire)

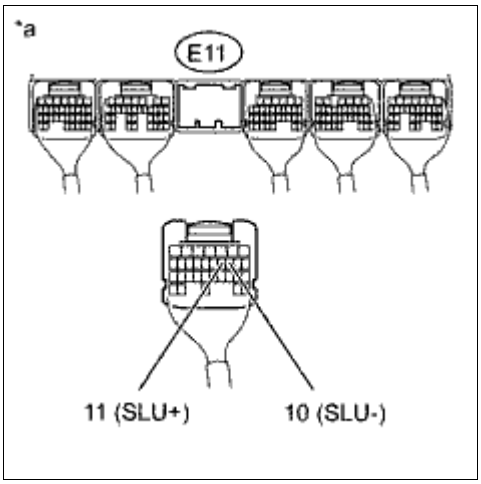
NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E11-11 (SLU+) - E11-10 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
E11-11 (SLU+) - Body ground	Always	10 kΩ or higher
E11-10 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

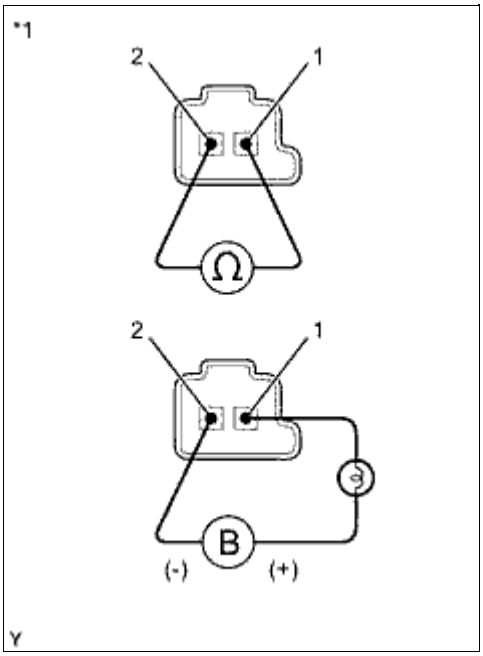
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SLU**

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(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▶ **REPLACE TRANSMISSION WIRE**

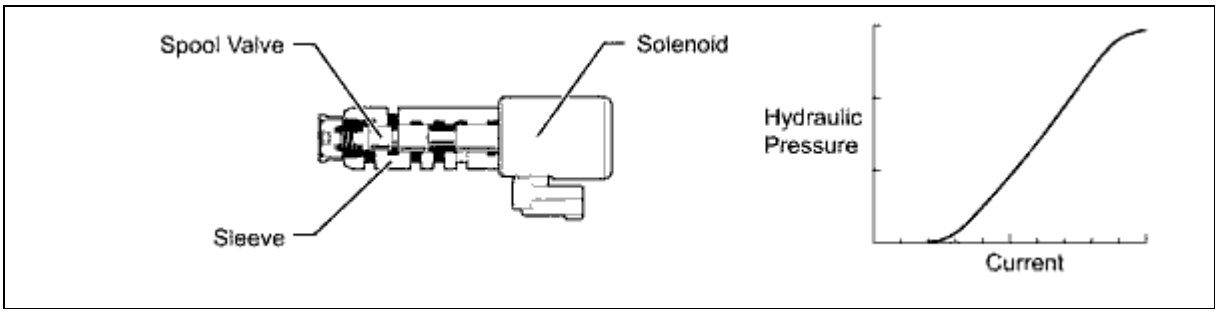
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8D0KMX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P27567F; Torque Converter Clutch Pressure Control Solenoid Control Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P27567F**	**Torque Converter Clutch Pressure Control Solenoid Control Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, mass air flow meter, input turbine speed sensor, output shaft speed sensor and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.



The ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SLU, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P27567F	Both conditions are met (2 trip detection logic): • Lock-up does not occur when requested. • Lock-up occurs when shift solenoid valve SLU is requested to turn on in the lock-up range.	• Shift solenoid valve SLU remains open or closed • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear, etc.) • Line pressure is too low	P2757

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SLU. When shift solenoid valve SLU is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

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If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SLU or lock-up system performance.

The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)
- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P2757: Shift solenoid valve SLU OFF malfunction Shift solenoid valve SLU ON malfunction
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec. ON malfunction: 1.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system))

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	U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376

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Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

ON malfunction:

ECM lock-up command	OFF (SLU pressure: Below 4 kPa (0.04 kgf/cm ^{2} , 0.6 psi))
Duration time from SLU command	3 sec. or more
Duration time from SL command ON	0.064 sec. or more
Shift solenoid valve SLU (P2757)	Not OFF malfunction
Throttle valve opening angle	11.5% or more at turbine speed of 4000 rpm (Condition varies with turbine speed)
Vehicle speed	Less than 120 km/h (74.5 mph)

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

| Engine speed - Turbine speed |	70 rpm or more

ON malfunction:

| Engine speed - Turbine speed |	Less than 35 rpm

COMPONENT OPERATING RANGE

Speed sensor (NT)	Input speed is equal to engine speed when lock-up is ON.

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

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1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up Solenoid	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more

HINT:

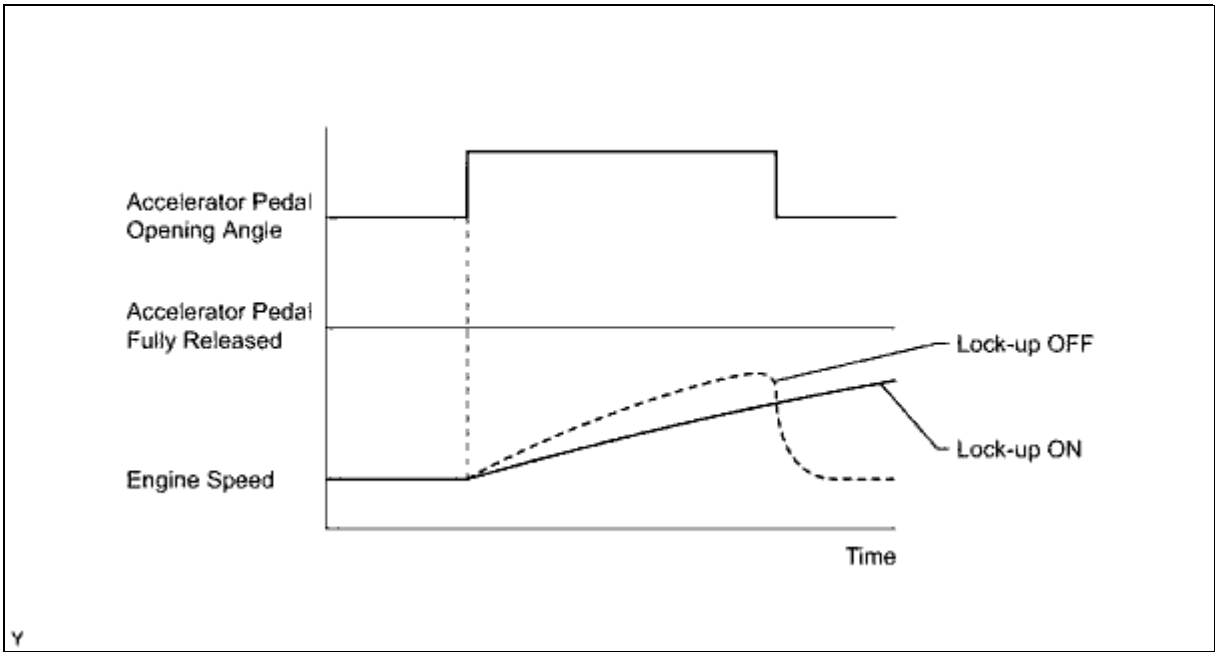
This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)

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PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P27567F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P27567F is output	A
P27567F and other DTCs are output	B

HINT:

If any DTCs other than P27567F are output, perform troubleshooting for those DTCs first.

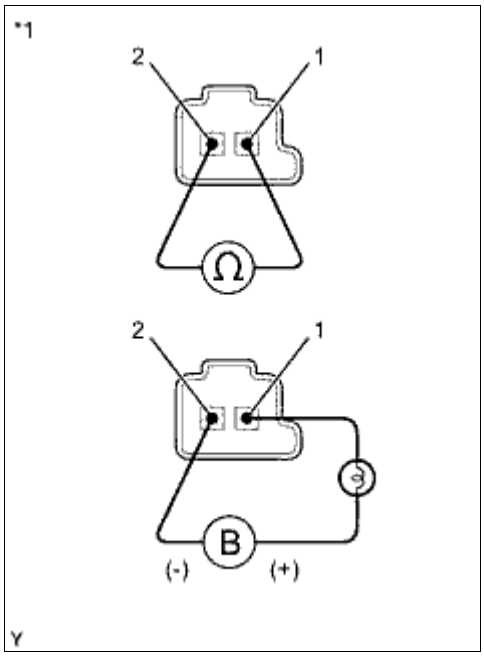
B ▶ **GO TO DTC CHART**

A ▼

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2.	**INSPECT SHIFT SOLENOID VALVE SLU**

(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▼

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3.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

4.	**INSPECT TORQUE CONVERTER ASSEMBLY**

(a) Check the torque converter assembly INFO .

OK:

The torque converter assembly operates normally.

NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VR05OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P280713; Pressure Control Solenoid "G" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P280713**	**Pressure Control Solenoid "G" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P280713	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL4 circuit while driving and shifting gears (SL4 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL4 circuit • Shift solenoid valve SL4 • ECM	P2810

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL4 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL4 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P2810: Shift solenoid valve SL4/Range check
Required sensors/Components	Shift solenoid valve SL4
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

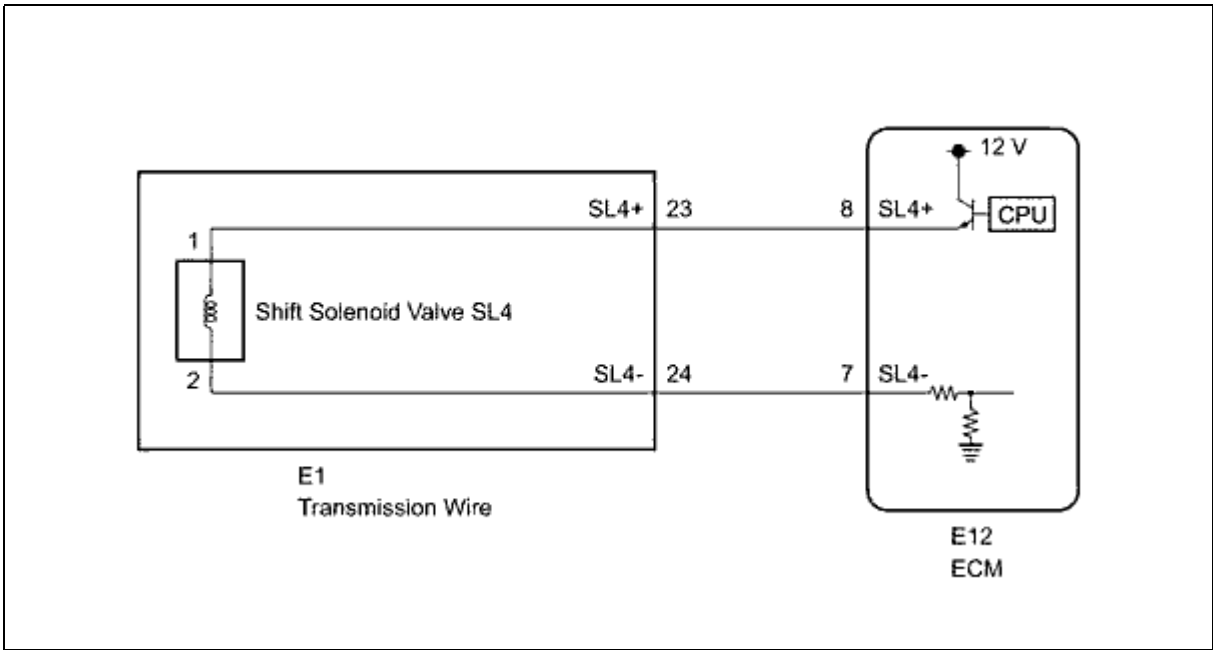
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL4 when the shift lever is in D:

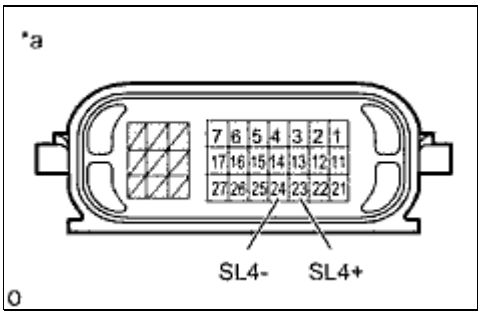
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL4)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
23 (SL4+) - 24 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
23 (SL4+) - Body ground	Always	10 kΩ or higher
24 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

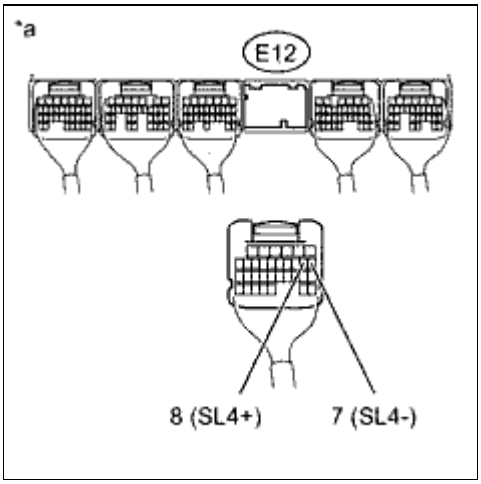
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-8 (SL4+) - E12-7 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
E12-8 (SL4+) - Body ground	Always	10 kΩ or higher
E12-7 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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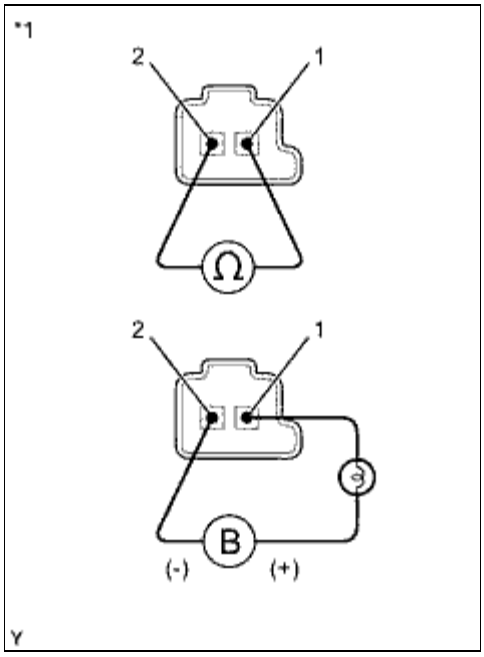
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

(a) Remove shift solenoid valve SL4 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL4

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VQ05VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P28077F; Pressure Control Solenoid "G" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P28077F**	**Pressure Control Solenoid "G" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P28077F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 3rd or 5th gear is commanded. • The condition that 4th gear is engaged when a shift to 4th gear is commanded occurs twice, and one of the following conditions is met: ○ When a shift to 1st gear is commanded, 3rd gear is engaged. ○ When a shift to 2nd gear is commanded, 3rd gear is engaged. ○ When a shift to 6th gear is commanded, 5th gear is engaged.	• Shift solenoid valve SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)	P2808

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P2808: Shift solenoid valve SL4/OFF malfunction Shift solenoid valve SL4/ON malfunction
Required sensors/Components	Shift solenoid valve SL4, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous

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Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher

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Engine	Running

OFF malfunction (A):

ECM select gear	3rd
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL4	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
Throttle valve opening angle	3% or more

OFF malfunction (B):

ECM select gear	5th
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL4	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
Throttle valve opening angle	3% or more

OFF malfunction (C):

ECM select gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed of 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (A):

ECM select gear	1st
Time after transition to 1st gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4

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Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (B):

ECM select gear	2nd
Time after transition to 2nd gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (C):

ECM select gear	6th
Time after transition to 6th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (D):

ECM select gear	4th
Time after transition to 4th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more

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Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or (C)

OFF malfunction (A):

Turbine speed - Output speed x 3rd gear ratio	1000 rpm or more

OFF malfunction (B):

Turbine speed - Output speed x 5th gear ratio	1000 rpm or more

OFF malfunction (C):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.3

[ON malfunction]

One of the following conditions are met: ON malfunction (A), (B) or (C) and ON malfunction (D) 2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction (A) and (B):

Turbine speed / Output speed when output speed less than 1000 rpm	1.3 to 1.65

ON malfunction (C):

Turbine speed / Output speed when output speed less than 1000 rpm	0.6376 to 0.7376

ON malfunction (D):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

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- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P28077F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P28077F is output	A
P28077F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

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(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	

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ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P07957F)**

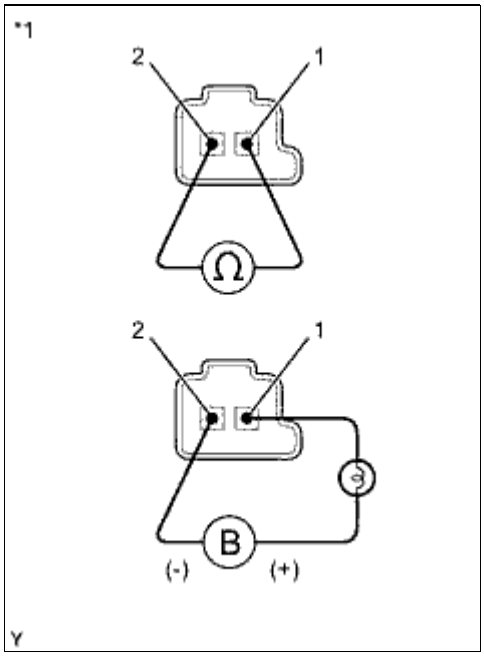
D ▶ **GO TO STEP 3**

E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P27137F)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P07457F)**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

(a) Remove shift solenoid valve SL4 INFO .



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL4**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

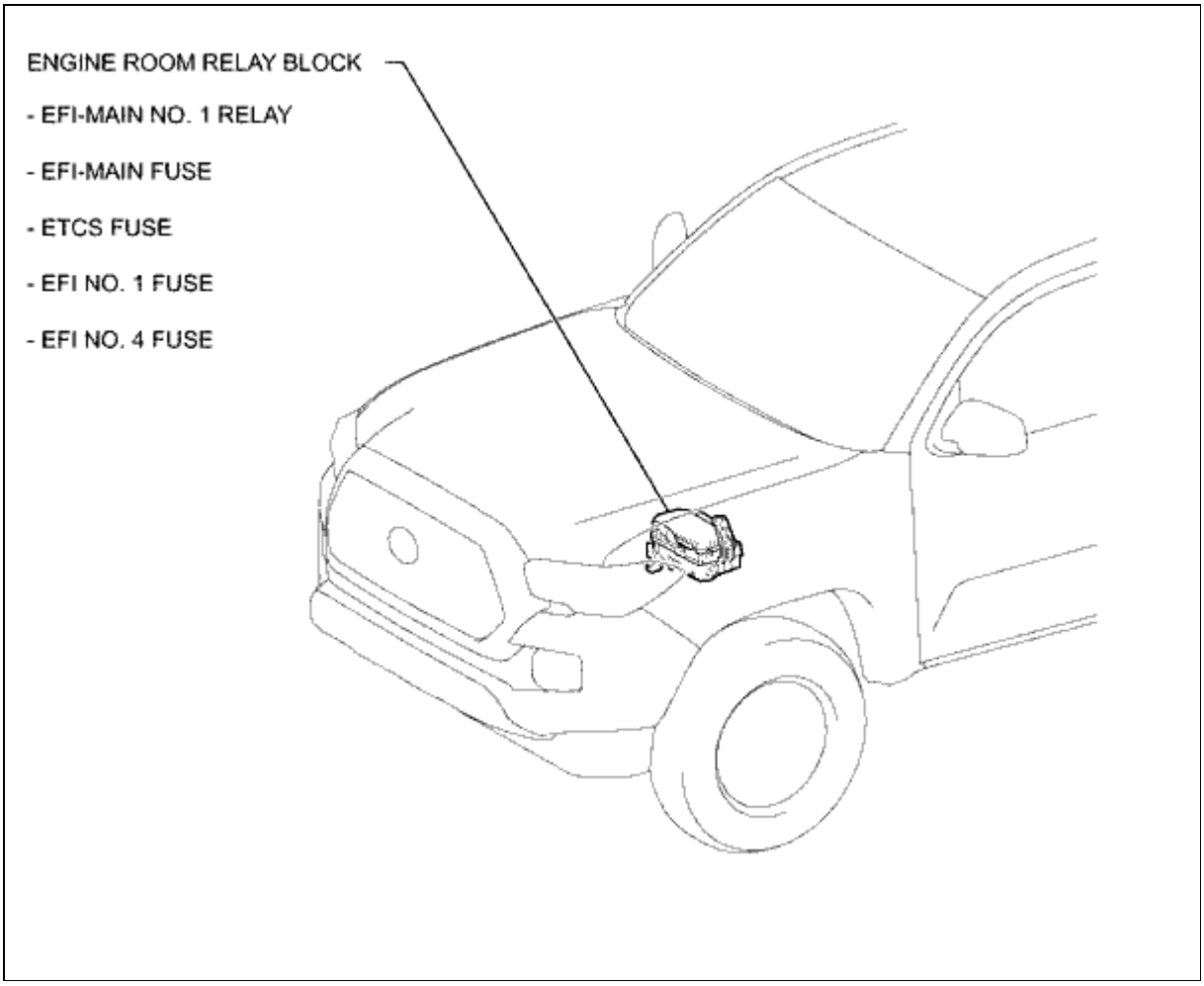
OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 R	**Doc ID:** RM000000W720LJX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): PARTS LOCATION; 2016 MY Tacoma [08/2015 -]		

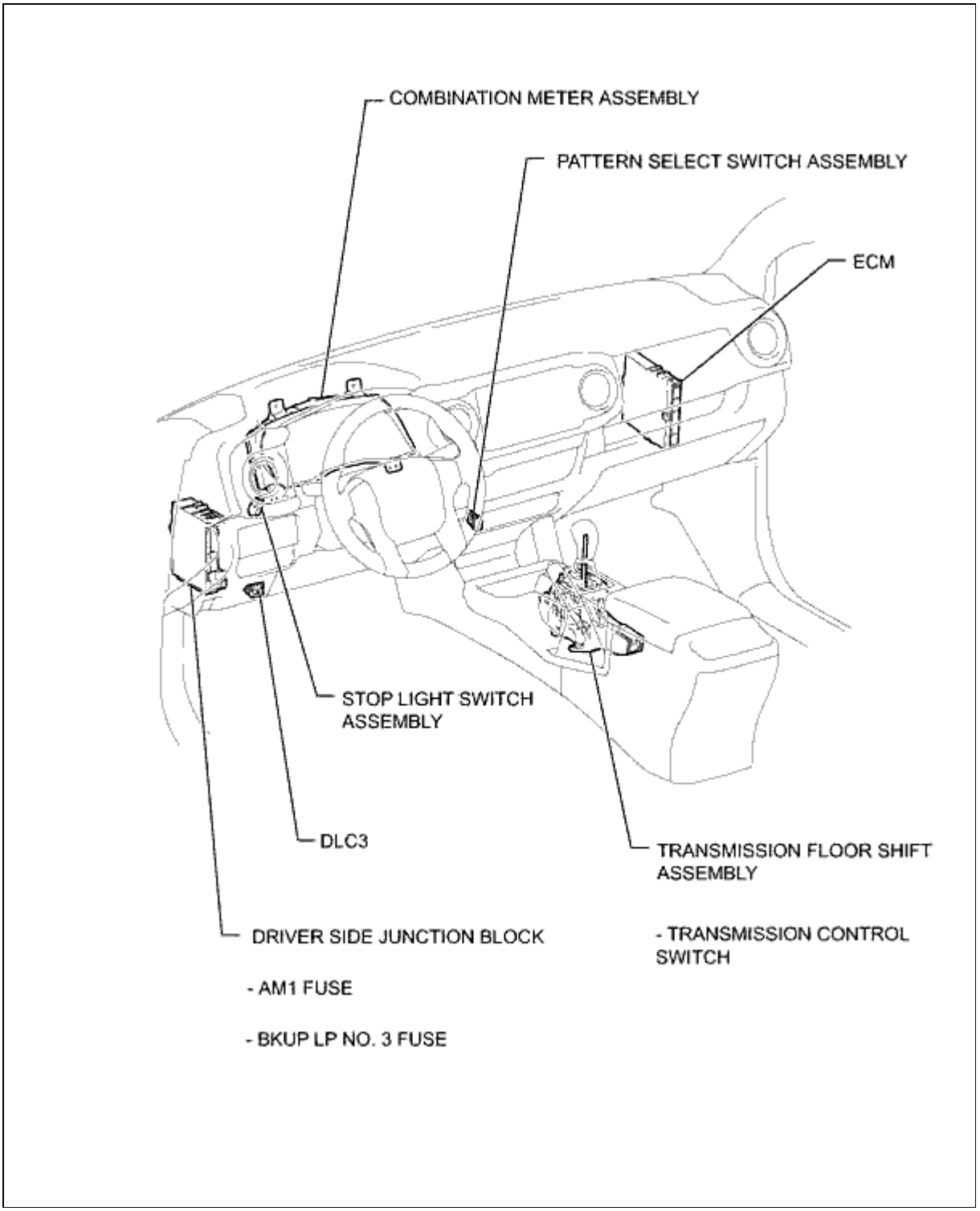
PARTS LOCATION

ILLUSTRATION



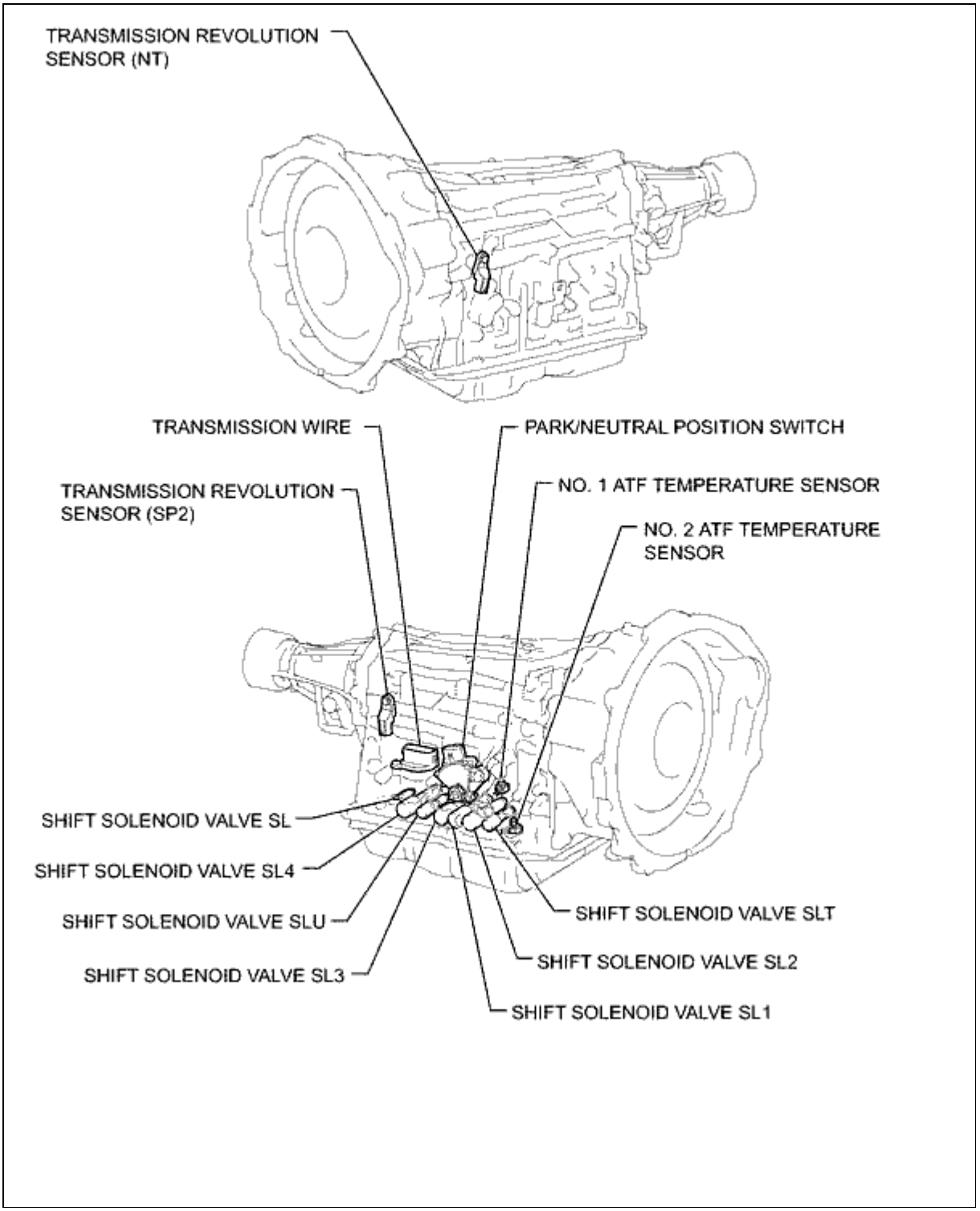
ILLUSTRATION

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ILLUSTRATION

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Last Modified: 11-13-2015	6.6 L	**Doc ID:** RM000000O7H0ITX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): PRECAUTION; 2016 MY Tacoma [08/2015 -]		

PRECAUTION

1. IGNITION SWITCH EXPRESSION

HINT:

The type of ignition switch used on this model differs depending on the specifications of the vehicle. The expressions listed in the table below are used in this section.

EXPRESSION	IGNITION SWITCH (POSITION)	ENGINE SWITCH (CONDITION)
Ignition Switch off	LOCK	Off (Lock)
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	On (Start)

2. PRECAUTION

NOTICE:

- When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected INFO .
- Perform the Reset Memory procedures (A/T initialization) after replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves INFO .

HINT:

Reset Memory cannot be completed by only reconnecting the cable to the negative (-) battery terminal.

- Perform Registration (VIN registration) when replacing the ECM INFO .

CAUTION:

When using compressed air, always aim away from yourself to prevent Automatic Transmission Fluid (ATF) or kerosene from spraying on your face.

NOTICE:

- The automatic transmission is composed of precision-made parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect performance.
- The procedures are organized so that you work on only one component group at a time. This will help avoid confusion with similar-looking parts of different sub-assemblies being on your workbench at the same time.
- The component groups are inspected and repaired from the converter housing side.
- Whenever possible, complete the inspection, repair and reassembly before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.
- Use of Toyota Genuine ATF WS is recommended.
- All disassembled parts should be washed clean, and compressed air should be blown through any fluid passages and holes.
- Dry all parts with compressed air. Never use cloth.
- The recommended ATF or kerosene should be used for cleaning.
- After cleaning, the parts should be arranged in the order they were removed for efficient inspection,

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repairs and reassembly.

- New discs for the brakes and clutches that will be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
- All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.
- All old gaskets and rubber O-rings must be replaced.
- Do not apply adhesive cement to gaskets and similar parts.
- Make sure that the ends of the snap rings are not aligned with any cutouts. Also make sure that snap rings are correctly installed into the grooves.
- If a worn bushing is to be replaced, the sub-assembly containing the bushing must also be replaced.
- Check the thrust bearings and races for wear or damage. Replace them if necessary.
- Use petroleum jelly to keep parts in place.
- When working with seal packing material, the following must be observed:
    - Using a razor blade and a gasket scraper, remove all the old seal packing material from the gasket surface.
    - Thoroughly clean all components to remove any loose material.
    - Clean both sealing surfaces with a non-residue solvent.
    - Parts must be reassembled within 10 minutes of application. Otherwise, the seal packing material must be removed and reapplied.

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Last Modified: 11-13-2015	6.6 T	**Doc ID:** RM000000W7314NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): PROBLEM SYMPTOMS TABLE; 2016 MY Tacoma [08/2015 -]		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- The Matrix Chart is divided into 2 chapters. When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to 2, proceed as instructed.
- If the instruction "Proceed to Next Suspected Area Shown in Problem Symptoms Table" is given in the flowchart for each circuit, proceed to the next suspected area in the table.
- If the problem still occurs even though there are no malfunctions in any of the circuits, check the ECM and replace it if necessary.
- *: When the circuit is defective, a DTC may be output.

1. Chapter 1: Electronic Circuit Matrix Chart

SYMPTOM	SUSPECTED AREA	SEE PAGE
No up-shift (1st to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No up-shift (2nd to 3rd)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No up-shift (3rd to 4th)	Shift solenoid valve SL2 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (4th to 5th)	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (5th to 6th)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No down-shift (6th to 5th)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
No down-shift (5th to 4th)	Shift solenoid valve SL1 circuit*	INFO
	ECM	INFO
No down-shift (4th to 3rd)	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (3rd to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (2nd to 1st)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No lock-up or no lock-up off	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	Stop light switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO INFO
	ECM	INFO
Shift point too high or too low	Throttle position sensor circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Park/neutral position switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO INFO
	Pattern select switch power mode circuit	INFO
	ECM	INFO
No gear change by moving shift lever to "+" or "-" while in S	Transmission control switch circuit	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Harsh engagement (N to D)	Shift solenoid valve SLT circuit*	INFO
	ECM	INFO
Harsh engagement (Any driving position)	Throttle position sensor circuit*	INFO
	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO INFO
	ECM	INFO
Harsh engagement (Lock-up)	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	ECM	INFO
Poor acceleration	Shift solenoid valve SLT circuit*	INFO
	No. 2 ATF temperature sensor circuit*	INFO INFO
	ECM	INFO
Shifting malfunction (Vehicle is stuck in 3rd or 5th gear)	ECM power source circuit	INFO
Changing gears takes time when up-shifting	Shift solenoid valve SL circuit*	INFO INFO
No engine braking	ECM	INFO
No kick-down	ECM	INFO
Slip or shudder (5th to 6th and 6th to 5th)	Shift solenoid valve SL circuit*	INFO INFO
ATF temperature warning indicator remains on	No. 2 ATF temperature sensor circuit*	INFO INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Lock-up in 3rd gear	No. 2 ATF temperature sensor circuit*	INFO INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
Vehicle moves forward with shift lever in N	Park/neutral position switch circuit*	INFO
	ECM	INFO
Engine stalls when starting off or stopping	Shift solenoid valve SLU circuit*	INFO
	ECM	INFO
Shifting malfunction	Park/neutral position switch circuit*	INFO
	Transmission control switch circuit	INFO
	ECM	INFO

2. Chapter 2: On-Vehicle Repair and Off-Vehicle Repair

SYMPTOM	SUSPECTED AREA	SEE PAGE
Vehicle does not move when shift lever is in any forward position or reverse position	Transmission control cable	INFO
	Manual valve	INFO
	Parking lock pawl	INFO
	Rear planetary gear unit	INFO
	Torque converter assembly	INFO
Vehicle does not move with shift lever in R	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
No up-shift (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	Shift solenoid valve SL2*	INFO
No up-shift (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL1*	INFO
No up-shift (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
No down-shift (6th to 5th)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (5th to 4th)	Shift solenoid valve SL1*	INFO
	No. 1 clutch (C1)	INFO
	Valve body assembly	INFO
No down-shift (4th to 3rd)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL2*	INFO
	Valve body assembly	INFO
No down-shift (3rd to 2nd)	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (2nd to 1st)	Valve body assembly	INFO
	Shift solenoid valve SL3*	INFO
No lock-up or No lock-up off	Valve body assembly	INFO
	Torque converter assembly	INFO
Harsh engagement (N to D)	Valve body assembly	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	Shift solenoid valve SL1*	INFO
Harsh engagement (Lock-up)	Valve body assembly	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	Torque converter assembly	INFO
	Shift solenoid valve SLU*	INFO
Harsh engagement (N to R)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (1st to 2nd to 3rd to 4th to 5th to 6th)	Valve body assembly	INFO
	Shift solenoid valve SLT*	INFO
Harsh engagement (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO
	Shift solenoid valve SL2*	INFO
Harsh engagement (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (6th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Slip or shudder (forward and reverse, after warm-up)	Transmission control cable	INFO
	Valve body assembly	INFO
	Oil strainer	INFO
	No. 1 brake (B1)	INFO
	No. 2 brake (B2)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	No. 3 brake (B3)	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
	Torque converter assembly	INFO
Slip or shudder (particular position, just after engine starts)	Torque converter assembly	INFO
Slip or shudder (shift lever in R)	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
Slip or shudder (1st)	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (2nd)	No. 1 brake (B1)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (3rd)	No. 3 brake (B3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (4th)	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (5th)	No. 3 brake (B3)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO
No engine braking (1st to 4th, shift lever in S)	No. 1 clutch (C1)	INFO
No engine braking (1st)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 1 clutch (C1)	INFO
No kick-down	Valve body assembly	INFO
Shift point too high or too low	Valve body assembly	INFO
Poor acceleration (All positions)	Valve body assembly	INFO
	Torque converter assembly	INFO
Poor acceleration (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Engine stalls when starting off or stopping	Front planetary gear unit	INFO
	Valve body assembly	INFO
	Torque converter assembly	INFO

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Last Modified: 11-13-2015	6.6 J	**Doc ID:** RM0000031IU03LX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): Pattern Select Switch Power Mode Circuit; 2016 MY Tacoma [08/2015 -]		

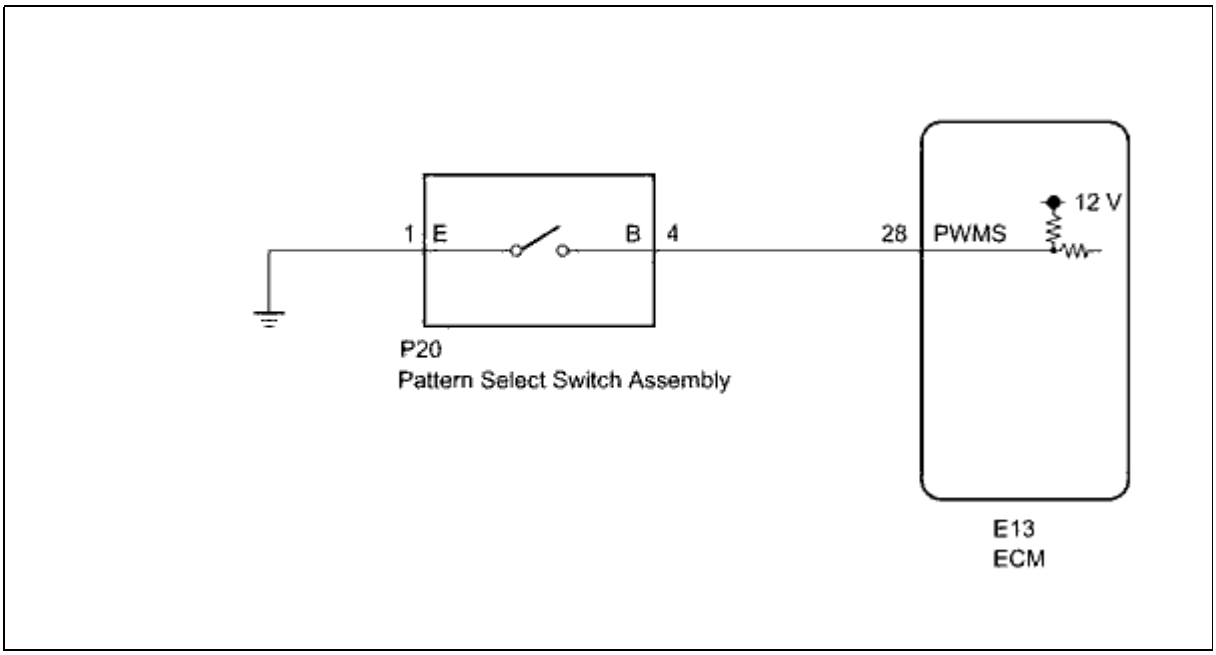
Pattern Select Switch Power Mode Circuit

DESCRIPTION

The ECM memory contains the programs for the normal and PWR shift patterns.

By following the programs corresponding to the signals from the pattern select switch assembly, park/neutral position switch and other various sensors, the ECM switches the shift solenoid valves on and off, and controls the transmission gear ratio.

WIRING DIAGRAM



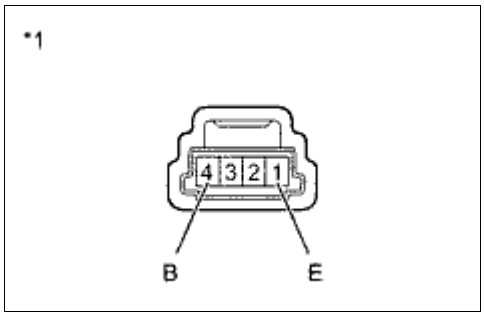
INSPECTION PROCEDURE

PROCEDURE

1.	**INSPECT PATTERN SELECT SWITCH ASSEMBLY**

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(a) Remove the pattern select switch assembly INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 (E) - 4 (B)	Pattern select switch assembly pushed	Below 1 Ω
1 (E) - 4 (B)	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

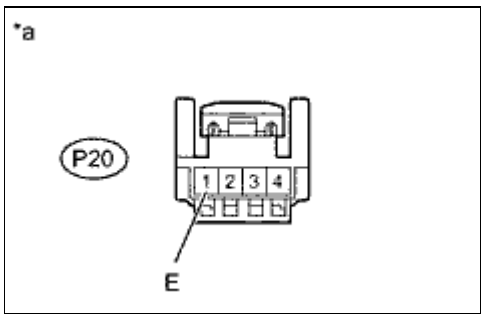
*1	Pattern Select Switch Assembly

NG ▶ **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - BODY GROUND)**

(a) Disconnect the pattern select switch assembly connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P20-1 (E) - Body ground	Always	Below 1 Ω

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Text in Illustration

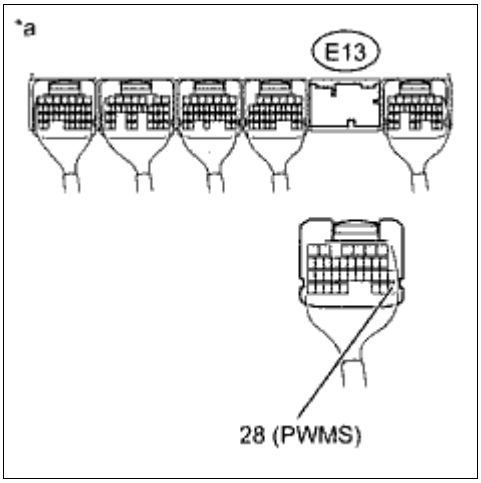
*a	Front view of wire harness connector (to Pattern Select Switch Assembly)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
E13-28 (PWMS) - Body ground	Pattern select switch assembly pushed	Below 1 Ω
E13-28 (PWMS) - Body ground	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W790THX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): ROAD TEST; 2016 MY Tacoma [08/2015 -]		

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

(a) Based on the result of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transmission does not shift up or down, or that the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and attempt to duplicate the problem symptoms.

2. ROAD TEST

(a) Perform a road test.

CAUTION:

Check for safety before performing any tests.

NOTICE:

- Be sure to inspect and adjust the engine before performing these tests.
- Perform the road test with the engine coolant temperature is 70°C (158°F) or higher and the ATF temperature between 40 and 110°C (104 and 230°F).
- Perform these tests with the air conditioning and cruise control off.

INSPECTION	PROCEDURE
Transmission Control Switch Test	With the vehicle stationary and the shift lever in D, move the shift lever to S and return it to D. Check that the meter display changes from D to the appropriate S range and then back again.
S Position Test	With the vehicle stationary and the shift lever in S, move the shift lever to "+" and "-". Check that the meter display changes between S ranges properly.
D Position Shift Test	While driving the vehicle normally, check that the transmission shifts up and down through each gear properly.
Lock-up Function	While driving on a level surface at a constant speed in the lock-up range with the shift lever in D, lightly depress the accelerator pedal and check that the engine speed does not change abruptly.
P Position Test	Stop the vehicle on an incline (approximately 5° or more). Then move the shift lever to P and release the parking brake. Check that the parking lock pawl holds the vehicle in place.
Abnormal Noise and Vibration	Check for abnormal noise and vibration while driving the vehicle forward and backward, and during shift operations.
Fluid Leakage	After performing all other road test inspections, check for fluid leakage.

HINT:

When checking for DTCs after a repair, drive the vehicle according to the monitor drive pattern INFO .

(b) Shift schedule confirmation

(1) Connect the Techstream to the DLC3.

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(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Transmission / Data List / Vehicle Speed, Accel Position from EFI and Shift Status.

(5) Check that the "Shift Status" changes in accordance with the "Vehicle Speed" as shown in the following table.

Shift Schedule Chart

ACCELERATOR POSITION	6%				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	10 to 15 km/h (6 to 9 mph)	20 to 30 km/h (12 to 19 mph)	30 to 40 km/h (19 to 25 mph)	45 to 55 km/h (28 to 34 mph)	60 to 75 km/h (37 to 47 mph)

NOTICE:

- All vehicle speeds indicated in the above table are actual values. Therefore, if checking a shift point with a chassis dynamometer, keep in mind that there is a margin of error in the chassis dynamometer indication.
- If checking a shift point against the vehicle speed indicated on the speedometer, remember to consider the speedometer correction rate and margin of error in the Techstream indication.

(c) Lock-up confirmation

(1) Connect the Techstream to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Transmission / Data List / Vehicle Speed, Engine Speed, Accel Position from EFI, NT Sensor Speed, A/T Oil Temperature 1, Lock Up Status and Shift Status.

(5) When the following conditions are met, check that the difference between "Engine Speed" and "NT Sensor Speed" is 50 rpm or less.

Lock-up Schedule

Accel Position from EFI	6%
Vehicle Speed	80 km/h (50 mph) or more
Shift Status	6th gear
Lock Up Status	ON

HINT:

Lock-up prohibition conditions:

- A/T oil temperature is below 40°C (104°F)
- Engine coolant temperature is below 70°C (158°F)
- Shift range between "1" (S1 range) and "3" (S3 range)
- Accelerator pedal is fully released
- Stop light switch signal is on

(d) Manual down-shift permission speed

(1) Manual down-shift is permitted for each shift status when the vehicle speed is below the corresponding range shown in the following table.

Manual Down-shift Permission Speed Chart

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SHIFT STATUS (SHIFT LEVER IN S)	S6 TO S5	S5 TO S4	S4 TO S3	S3 TO S2	S2 TO S1
Vehicle Speed	280 to 305 km/h (174 to 190 mph)	190 to 210 km/h (118 to 130 mph)	125 to 145 km/h (78 to 90 mph)	90 to 100 km/h (56 to 62 mph)	40 to 50 km/h (25 to 31 mph)

(e) Shift schedule when accelerator pedal is fully depressed

Shift Schedule Chart

ACCELERATOR PEDAL	FULLY DEPRESSED				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	45 to 55 km/h (28 to 34 mph)	90 to 105 km/h (56 to 65 mph)	130 to 150 km/h (81 to 93 mph)	210 to 230 km/h (130 to 143 mph)	305 to 330 km/h (190 to 205 mph)

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W750TLX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): SYSTEM DESCRIPTION; 2016 MY Tacoma [08/2015 -]		

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The Electronic Controlled Automatic Transmission (ECT) is an automatic transmission that has its shift timing electronically controlled by the ECM. The ECM detects electrical signals that indicate engine and driving conditions, and controls the shift point, based on driver's habits and road conditions. As a result, fuel efficiency and transmission performance are improved.

Shift shock has been reduced by controlling the engine and transmission simultaneously.

In addition, the ECT has features such as:

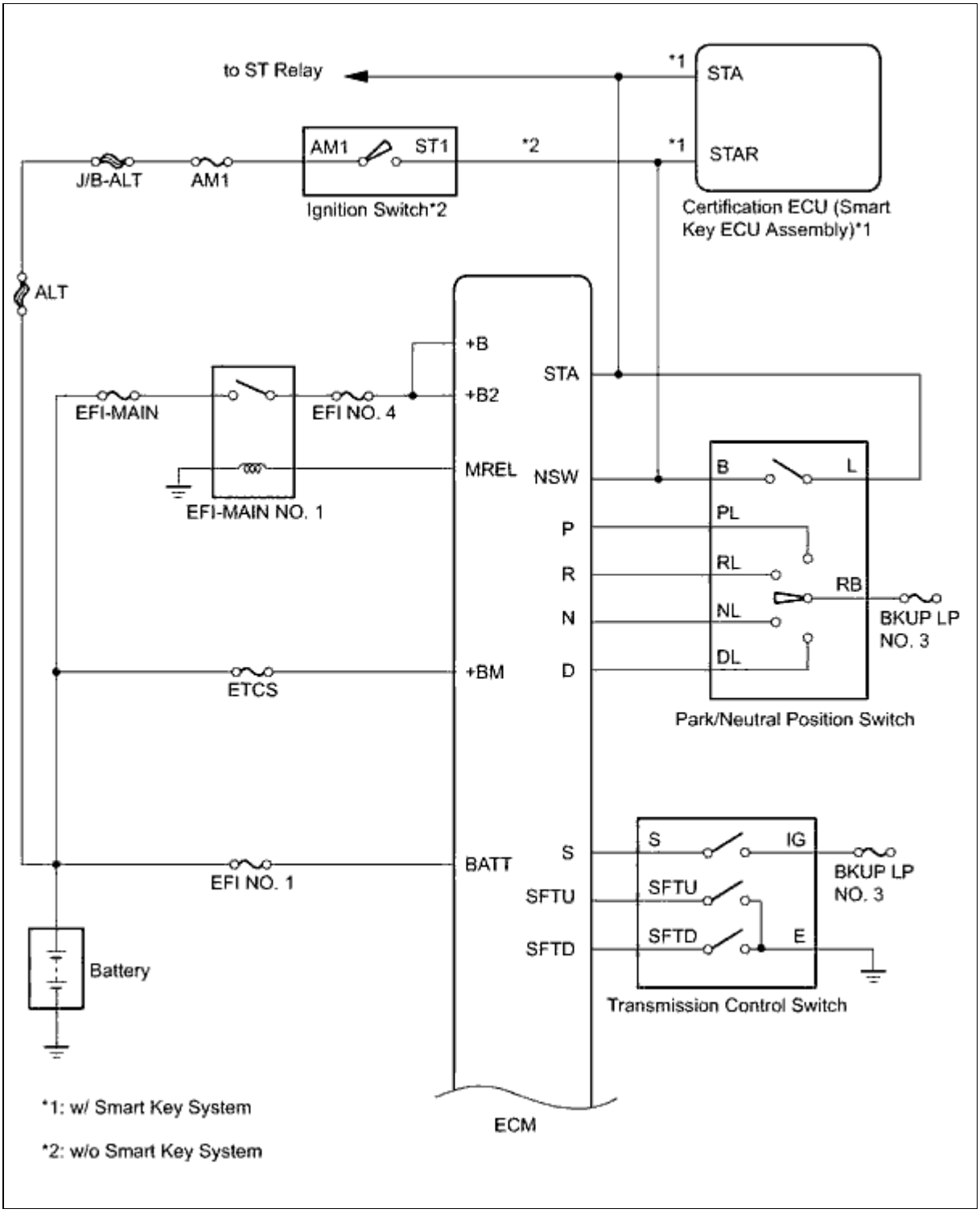
- Diagnostic function.
- Fail-safe function for use when a malfunction occurs.

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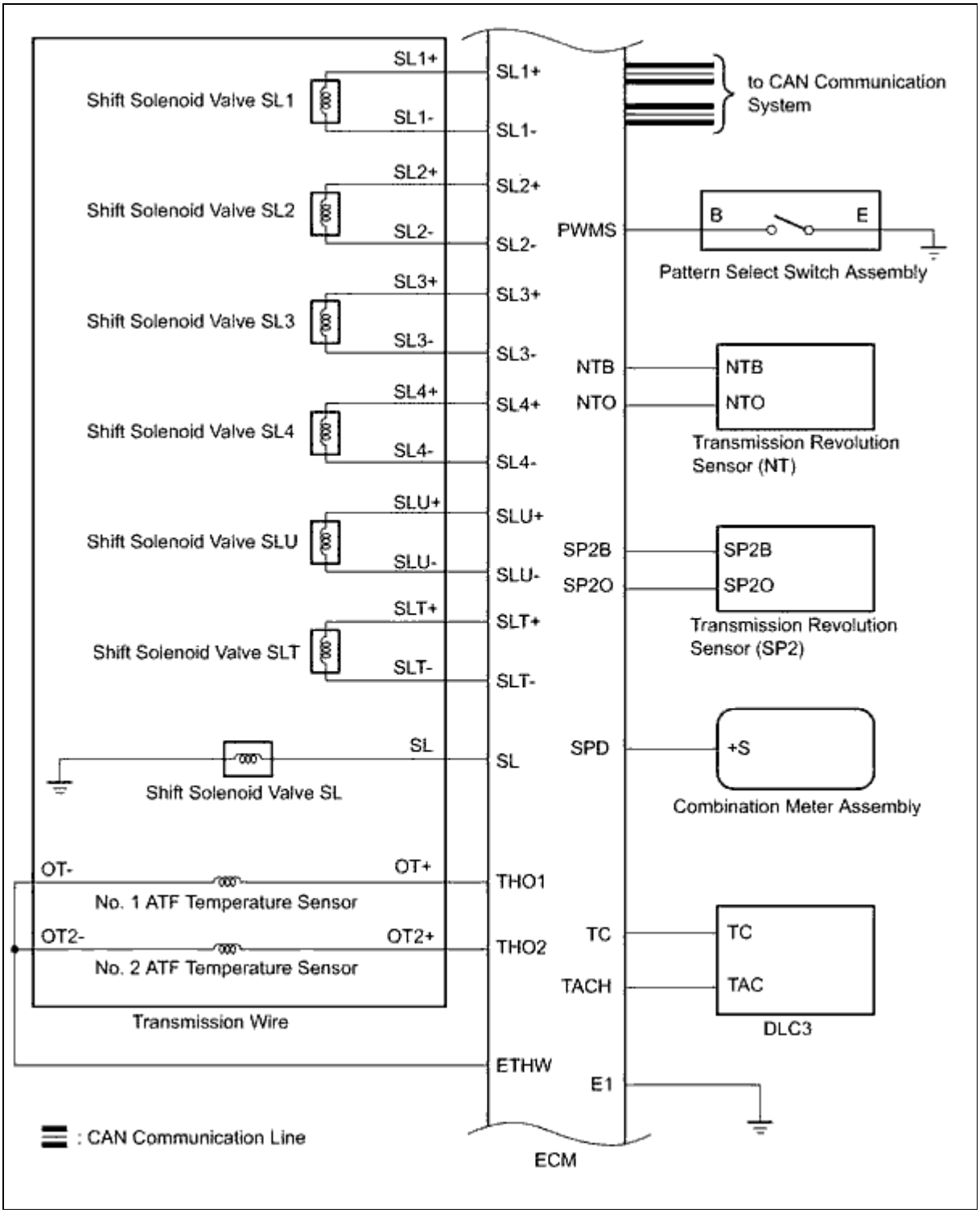
Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7D0LZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): SYSTEM DIAGRAM; 2016 MY Tacoma [08/2015 -]		

SYSTEM DIAGRAM

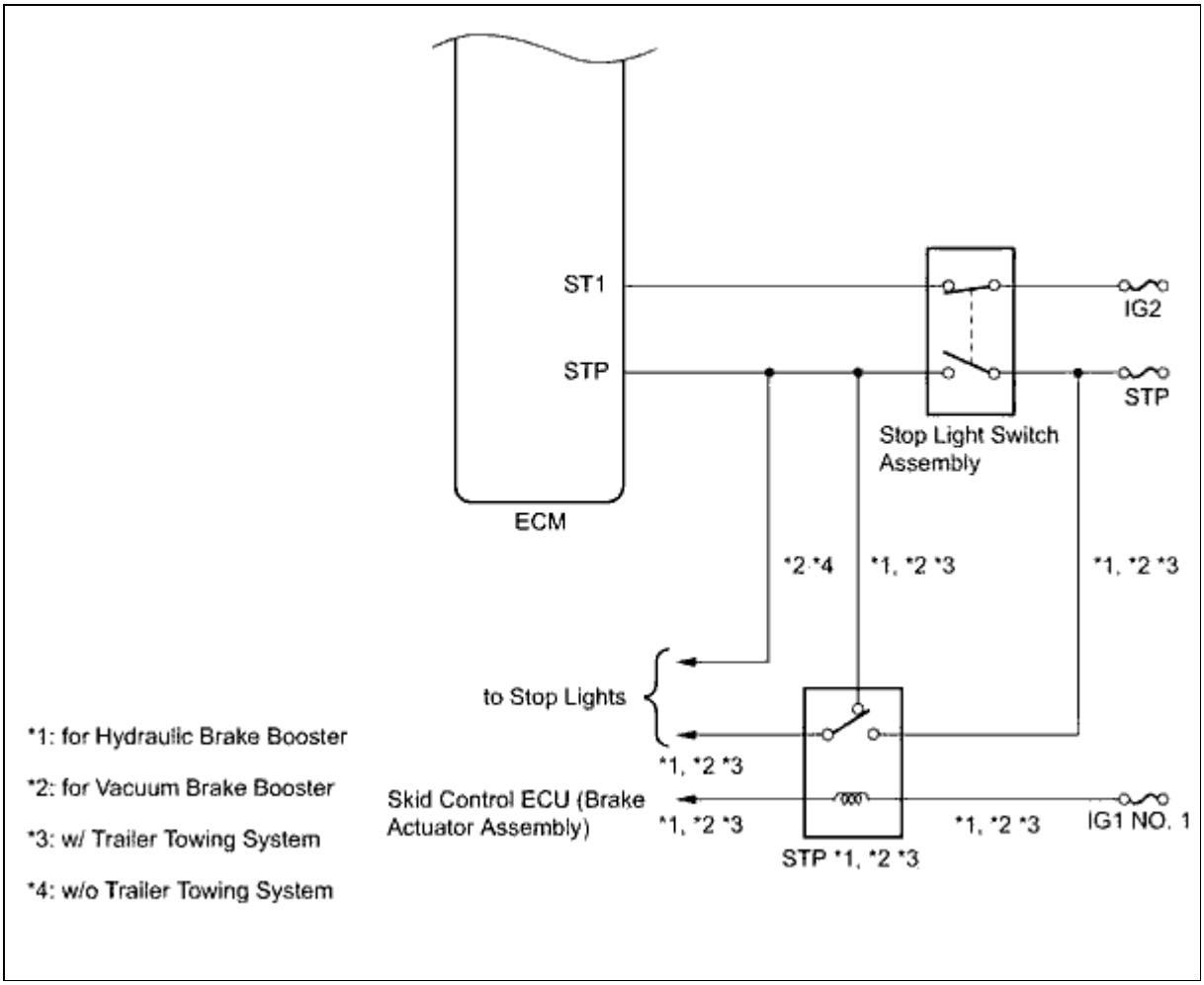
The configuration of the electronic control system in the AC60E automatic transmission is as shown in the following chart.



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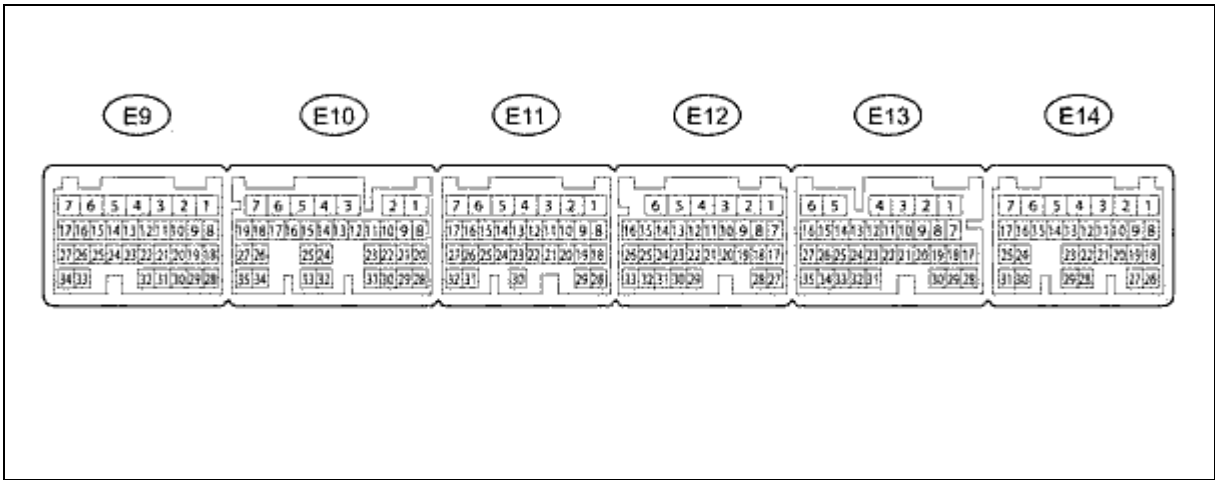


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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000137007CX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): TERMINALS OF ECM; 2016 MY Tacoma [08/2015 -]		

TERMINALS OF ECM

1. ECM



HINT:

The standard voltage between each pair of ECM terminals is shown in the table below. In the table, first follow the information under "Condition". Look under "Terminal No. (Symbol)" for the terminals to be inspected. The standard voltage between the terminals is shown under "Specified Condition".

Use the illustration above as a reference for the ECM terminals.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E10-26 (THO1) - E9-23 (ETHW)	P - BR	No. 1 ATF temperature sensor signal	No. 1 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E10-34 (THO2) - E9-23 (ETHW)	L - BR	No. 2 ATF temperature sensor signal	No. 2 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E11-9 (SL1+) - E11-8 (SL1-)	R - V	Shift solenoid valve SL1 signal	1st, 2nd, 3rd or 4th gear	Pulse generation
13-11 (SLU+) - E13-10 (SLU-)	P - L	Shift solenoid valve SLU signal	2nd, 3rd, 4th, 5th or 6th gear (Flex lock-up on)	Pulse generation
E11-13 (SLT+) - E11-12 (SLT-)	LG - Y	Shift solenoid valve SLT signal	Engine idling	Pulse generation
E12-8 (SL4+) - E12-7 (SL4-)	SB - BE	Shift solenoid valve SL4 signal	3rd or 5th gear	Pulse generation
E12-14 (SL3+) - E12-13 (SL3-)	B - W	Shift solenoid valve SL3 signal	2nd or 6th gear	Pulse generation
E12-15 (SL) - E11-1 (E1)	R - W-B	Shift solenoid valve SL signal	All gears	11 to 14 V

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E12-17 (R) - E11-1 (E1)	V - W-B	R shift position switch signal	Ignition switch ON and shift lever in R	11 to 14 V
			Ignition switch ON and shift lever not in R	Below 1 V
E12-18 (P) - E11-1 (E1)	GR - W-B	P shift position switch signal	Ignition switch ON and shift lever in P	11 to 14 V
			Ignition switch ON and shift lever not in P	Below 1 V
E12-20 (SL2+) - E12-19 (SL2-)	GR - BE	Shift solenoid valve SL2 signal	4th, 5th or 6th gear	Pulse generation
E12-26 (SP2B) - E11-1 (E1)	G - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E12-27 (D) - E11-1 (E1)	R - W-B	D shift position switch signal	Ignition switch ON and shift lever in D, S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in D, S, "+" or "-"	Below 1 V
E12-28 (N) - E11-1 (E1)	G - W-B	N shift position switch signal	Ignition switch ON and shift lever in N	11 to 14 V
			Ignition switch ON and shift lever not in N	Below 1 V
E12-31 (NTO) - E11-1 (E1)	W - W-B	Transmission revolution sensor (NT) signal	Engine idling	Pulse generation
E12-32 (NTB) - E11-1 (E1)	Y - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E12-33 (SP2O) - E11-1 (E1)	L - W-B	Transmission revolution sensor (SP2) signal	Vehicle driving	Pulse generation
E13-7 (SFTD) - E11-1 (E1)	R - W-B	Down-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "-" (Down-shift)	Below 1 V
E13-8 (SFTU) - E11-1 (E1)	G - W-B	Up-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "+" (Up-shift)	Below 1 V
E13-12 (STA) - E11-1 (E1)	Y - W-B	Starter assembly signal	Cranking	6 V or higher
E13-13 (NSW) - E11-1 (E1)	V - W-B	Park/neutral position switch signal	Ignition switch ON and shift lever in P or N	Below 1 V
			Ignition switch ON and shift lever not in P or N	11 to 14 V
E13-16 (STP) -	P - W-B	Stop light switch assembly	Brake pedal depressed	7.5 to 14 V

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E11-1 (E1)		signal	Brake pedal released	0 to 1.5 V
E13-24 (SPD) - E11-1 (E1)	R - W-B	Vehicle speed signal	Vehicle being driven	Pulse generation
E13-27 (CANH) - E11-1 (E1)	B - W-B	CAN communication line	Ignition switch ON	Pulse generation
E13-28 (PWMS) - E11-1 (E1)	P - W-B	Pattern select switch signal	Ignition switch ON and pattern select switch pushed	Below 1 V
			Ignition switch ON and pattern select switch not pushed	11 to 14 V
E13-32 (S) - E11-1 (E1)	P - W-B	S shift position switch signal	Ignition switch ON and shift lever in S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in S, "+" or "-"	Below 1 V
E13-35 (CANL) - E11-1 (E1)	W - W-B	CAN communication line	Ignition switch ON	Pulse generation
E14-2 (BATT) - E11-1 (E1)	L - W-B	Battery (for measuring battery voltage and for ECM memory)	Always	11 to 14 V

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Last Modified: 11-13-2015	6.6 J	**Doc ID:** RM000000WP10L3X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): Transmission Control Switch Circuit; 2016 MY Tacoma [08/2015 -]		

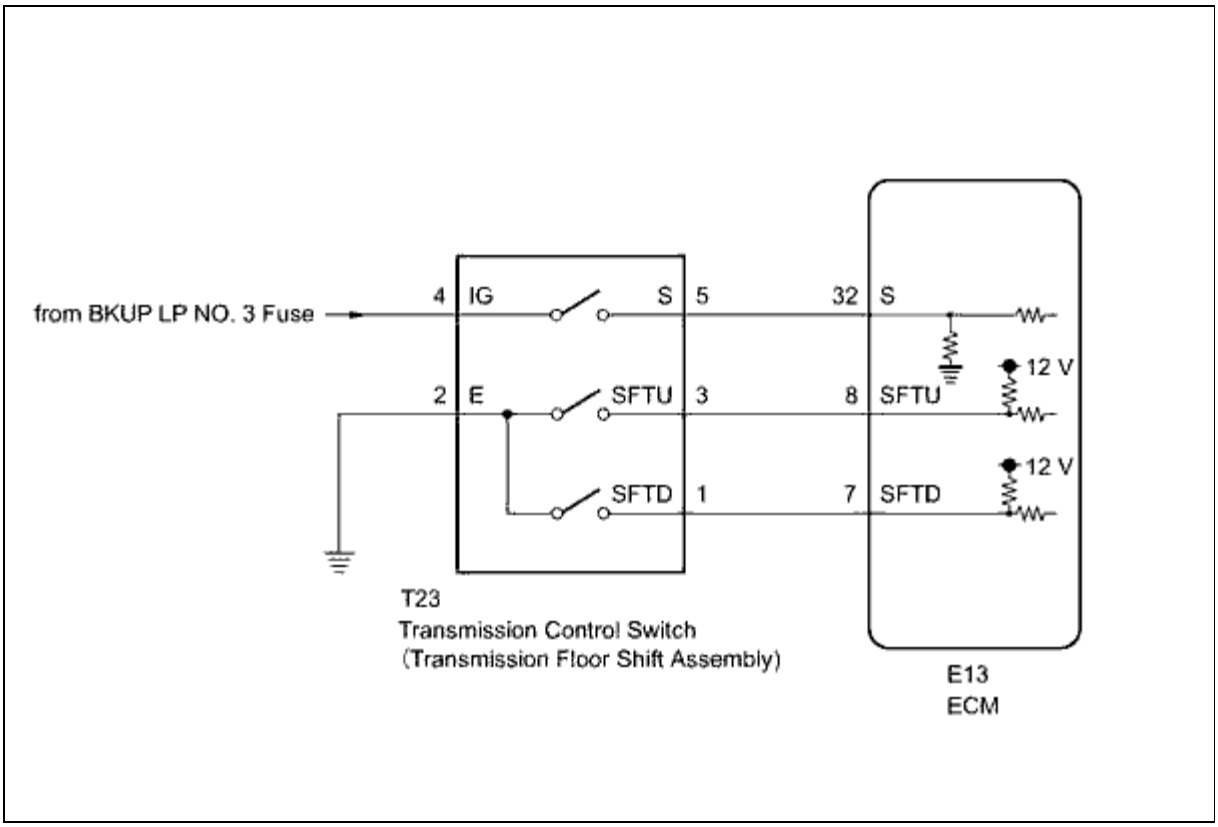
Transmission Control Switch Circuit

DESCRIPTION

After moving the shift lever to S, it is possible to switch the shift range between "1" (S1 range) and "6" (S6 range) using the transmission control switch.

Moving the shift lever to "+" once raises the shift range by one, and moving the shift lever to "-" once lowers the shift range by one.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SHIFT SW STATUS (S RANGE))**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Shift SW Status (S Range)	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-

Result

RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 6**

A ▼

2.	**READ VALUE USING TECHSTREAM (SPORTS SHIFT UP SW AND SPORTS SHIFT DOWN SW)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Shift Up SW	Sport shift up switch status/ ON or OFF	• ON: Shift lever held in "+" (up-shift) • OFF: Shift lever not held in "+" (up-shift)	-
Sports Shift Down SW	Sport shift down switch status/ ON or OFF	• ON: Shift lever held in "-" (down-shift) • OFF: Shift lever not held in "-" (down-shift)	-

Result

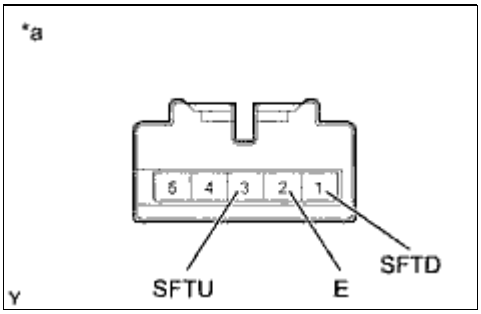
RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 3**

A ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

3.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever held in "+" (Up-shift)	Below 1 Ω
1 (SFTD) - 2 (E)	Shift lever held in "-" (Down-shift)	Below 1 Ω

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever not held in "+"	10 kΩ or higher
1 (SFTD) - 2 (E)	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

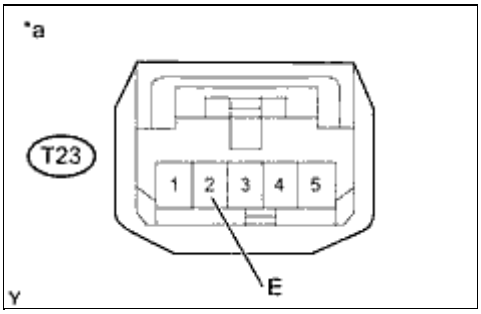
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

4.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - BODY GROUND)**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-2 (E) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

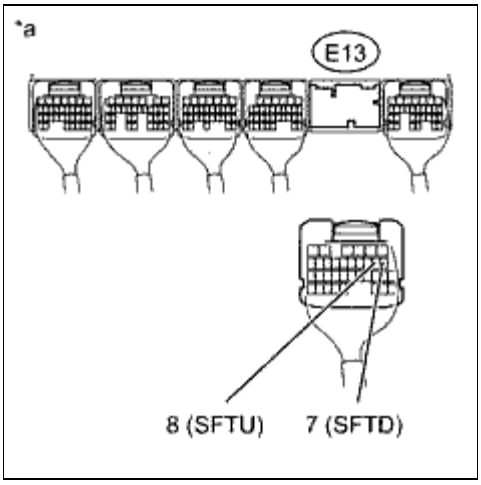
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

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5.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E13-8 (SFTU) - Body ground	Shift lever held in "+" (Up-shift)	Below 1 Ω
E13-7 (SFTD) - Body ground	Shift lever held in "-" (Down-shift)	Below 1 Ω
E13-8 (SFTU) - Body ground	Shift lever not held in "+"	10 kΩ or higher
E13-7 (SFTD) - Body ground	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

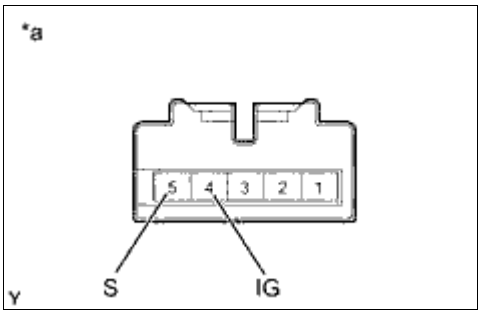
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

6.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

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(a) Disconnect T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "- "	Below 1 Ω
4 (IG) - 5 (S)	Shift lever not in S, "+" or "-"	10 kΩ or higher

Text in Illustration

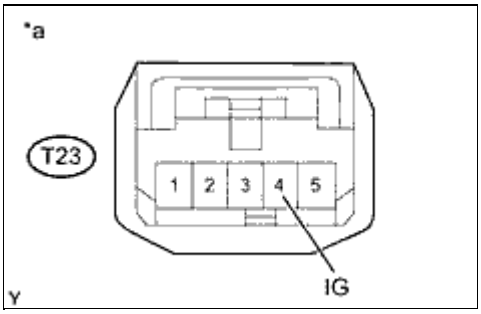
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

7.	**CHECK HARNESS AND CONNECTOR (BATTERY - TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY))**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T23-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
T23-4 (IG) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

8.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - ECM)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-5 (S) - E13-32 (S)	Always	Below 1 Ω
T23-5 (S) - Body ground	Always	10 kΩ or higher
E13-32 (S) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001RRQ09OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): U010087; Lost Communication with ECM/PCM "A" Missing Message; 2016 MY Tacoma [08/2015 -]		

DTC	**U010087**	**Lost Communication with ECM/PCM "A" Missing Message**

DESCRIPTION

The engine control unit and the transmission control unit are located inside the ECM. The engine control unit intercommunicates with the transmission control unit with the Controller Area Network (CAN).

If there is a problem in this intercommunication, the ECM stores a DTC.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
U010087	All conditions are met for 1.25 seconds or more (1-trip detection logic): (A) The ignition switch is ON and battery voltage is 9.5 V or higher. (B) There is no communication between the engine control unit and transmission control unit.	ECM	U0100

MONITOR STRATEGY

Related DTCs	U0100: Verify communication
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1.25 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery Voltage	9.5 V or higher
Ignition Switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Communication signal	Lost communication with engine control unit

INSPECTION PROCEDURE

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NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Check the battery voltage is 9.5 V or higher.
2. Turn the ignition switch ON.
3. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK DTC OUTPUT (IN ADDITION TO DTC U010087)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only U010087 is output	A
U010087 and other DTCs are output	B

B ▶ **GO TO DTC CHART**

A ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W780XKX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): CHECK MODE PROCEDURE; 2016 MY Tacoma [08/2015 -]		

CHECK MODE PROCEDURE

1. DESCRIPTION

(a) Check mode has a higher sensitivity to malfunctions and can detect malfunctions that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect. In check mode, DTCs are detected with 1 trip detection logic.

2. CHECK MODE PROCEDURE

(a) Make sure that the following conditions are met:

(1) Battery positive voltage 11 V or higher.

(2) Throttle valve fully closed.

(3) Shift lever in P or N.

(4) Air conditioning off.

(b) Turn the ignition switch off.

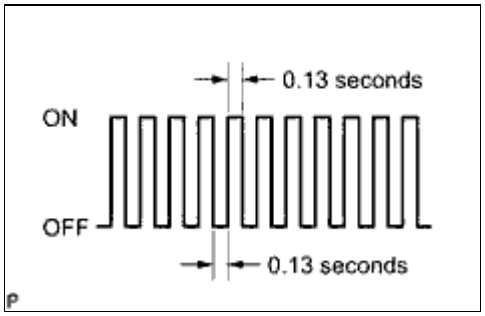
(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Utility / Check Mode.

(g) Change the ECM to check mode. Make sure the MIL flashes as shown in the illustration.



NOTICE:

All DTCs and freeze frame data will be cleared if: 1) the Techstream is used to change the ECM from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or off.

Before entering check mode, make notes of the DTCs and freeze frame data.

(h) Start the engine. The MIL should turn off after the engine starts.

(i) Perform Monitor Drive Pattern for the ECT test INFO .

(Or, simulate the conditions of the malfunction described by the customer.)

(j) After simulating the malfunction conditions, use the Techstream to check the DTC and freeze frame data.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7E104X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DATA LIST / ACTIVE TEST; 2016 MY Tacoma [08/2015 -]		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	-
Engine Speed	Engine speed/ Min.: 0 rpm Max.: 16384 rpm	600 to 700 rpm: Idling	-
Coolant Temp	Engine coolant temperature/ Min.: -40°C (-40°F) Max.: 140°C (284°F)	80 to 100°C (176 to 212°F): After warming up	• If value -40°C (-40°F): sensor circuit open • If value 140°C (284°F): sensor circuit shorted
Battery Voltage	Battery voltage/ Min.: 0 V Max.: 66.000 V	11 to 14 V: Ignition switch ON	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Accelerator Position	Accelerator pedal position/ Min.: 0% Max.: 399.9%	Actual accelerator pedal position	-
N Range Status	Shift lever N status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	-
Neutral Position SW Signal	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Stop Light Switch	Stop light switch status/ ON or OFF	• ON: Brake pedal depressed • OFF: Brake pedal released	-
SPD (NT)	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm.
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P • OFF: Shift lever not in P	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
			shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Pattern Switch (PWR/M)	PWR mode status/ ON or OFF	• ON: PWR mode on • OFF: PWR mode off	-
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in R	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N, P Range) Supported	Status of park/neutral position switch (N or P) supported/ Supp or Unsupp	-	-
Shift SW Status (N, P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	-
Sports Shift Up SW	Sport shift up switch status/ ON or OFF	• ON: Shift lever held in "+" (up-shift) • OFF: Shift lever not held in "+" (up-shift)	-
Sports Shift Down SW	Sport shift down switch status/	• ON: Shift lever held in "-" (down-shift)	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ON or OFF	• OFF: Shift lever not held in "-" (down-shift)	
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
A/T Oil Temperature 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.
A/T Oil Temperature 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.
ATF Thermal Degradation Estimate	Estimated value of ATF thermal degradation/ Min.: 0 Max.: 65535	-	If 50000 or more is displayed for the Data List item "ATF Thermal Degradation Estimate", thermal degradation of the ATF is suspected. Perform ATF Thermal Degradation Estimate Reset after replacing the ATF.
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-
SP2 Sensor Voltage	Transmission revolution sensor (SP2) output	0.1 to 1.9 V: Engine idling	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	voltage/ Min.: 0.000 V Max.: 4.999 V		
Lock Up	Lock up/ ON or OFF	• ON: Lock-up operating • OFF: Lock-up not operating	-
Shift Status	ECM gear shift command/ 1st, 2nd, 3rd, 4th, 5th or 6th	Same as actual gear	-
SLT Solenoid Status	Shift solenoid valve SLT status/ ON or OFF	• ON: Shift solenoid valve SLT operating • OFF: Shift solenoid valve SLT not operating	-
SLU Solenoid Status	Shift solenoid valve SLU status/ ON or OFF	• ON: Shift solenoid valve SLU operating • OFF: Shift solenoid valve SLU not operating	-
SL Solenoid Status	Shift solenoid valve SL status/ ON or OFF	• ON: Shift solenoid valve SL operating • OFF: Shift solenoid valve SL not operating	-
Torque Converter Temperature Raise History	Torque converter temperature raise history status/ ON or OFF	OFF	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

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(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Connect the TC and TE1	Connects and disconnects TC and TE1. (changes to the fluid temperature detection mode)	ON/OFF	[Vehicle Condition] • Ignition switch ON • Vehicle stopped
Activate the Solenoid (SLU)	Operates shift solenoid valve SLU	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SLT)*	Operates shift solenoid valve SLT to raise the line pressure.	ON/OFF **HINT:** ON: No action (normal operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid (SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	[Vehicle Condition] • Vehicle Stopped • Engine idling
Activate the Lock Up	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more
Activate the Solenoid (SL)	Operates shift solenoid valve SL	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission.

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
			[Vehicle Condition] 50 km/h (31 mph) or less
Activate the Solenoid (SL1)	Operates shift solenoid valve SL1	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL2)	Operates shift solenoid valve SL2	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL3)	Operates shift solenoid valve SL3	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL4)	Operates shift solenoid valve SL4	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N

*: The "Activate the Solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

Note that the pressure readings for the Active Test and Hydraulic Test are different.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7I0UAX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DEFINITION OF TERMS; 2016 MY Tacoma [08/2015 -]		

DEFINITION OF TERMS

TERM	DEFINITION
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and details).
Related DTCs	Group of diagnostic trouble codes that are output by the ECM based on the same malfunction detection logic.
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM stores a DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring if multiple sensors and components are used to detect the malfunction. While one sensor is being monitored, the next sensor or component will not be monitored.
Required sensor / Components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects a malfunction only once during a single driving cycle. "Continuous" means that the ECM detects a malfunction every time the enabling conditions are met.
Duration	The minimum time for which the ECM must detect a continuous deviation in the monitored value(s) in order to store a DTC. Timing begins after the "typical enabling conditions" are met.
Typical malfunction thresholds	Value beyond which the ECM will determine that there is a malfunction and store a DTC.
MIL operation	MIL illumination timing after a malfunction is detected. "Immediate" means that the ECM illuminates the MIL the instant the ECM determines that there is a malfunction. "2 driving cycles" means that the ECM illuminates the MIL if the same malfunction is detected again in the next driving cycle.
Component operating range	Normal operation range of sensors and solenoids under normal driving conditions. Use these ranges as a reference. They cannot be used to judge if a sensor or solenoid is defective or not.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7613GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DIAGNOSIS SYSTEM; 2016 MY Tacoma [08/2015 -]		

DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) When troubleshooting OBD II (On-Board Diagnostics) vehicles, an OBD II scan tool (complying with SAE J1987) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle ECM (Engine Control Module) can be then read.

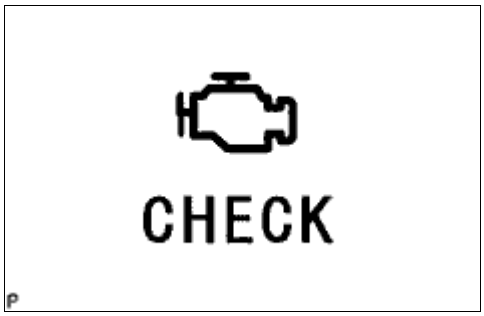
(b) OBD II regulations require that the vehicle on-board computer illuminate the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:

(1) The emission control system components.

(2) The powertrain control components (which affect vehicle emissions).

(3) The computer itself.

In addition, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



(c) To check for DTCs, connect the Techstream to the DLC3. The Techstream displays DTCs, freeze frame data, and a variety of the engine data. The DTCs and freeze frame data can be cleared with the Techstream. In order to enhance OBD function on vehicles and develop the off-board diagnosis system, Controller Area Network (CAN) communication is used in this system. CAN is a network which uses a pair of data transmission lines spanning multiple computers and sensors. It allows for high speed communications between the systems and simplification of the wire harness connections INFO .

2. NORMAL MODE AND CHECK MODE

(a) The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for duplicating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (the Techstream only).

3. 2 TRIP DETECTION LOGIC

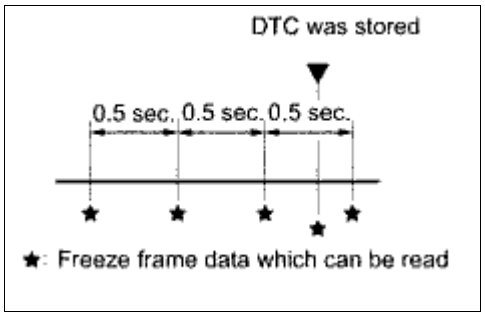
(a) When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the subsequent driving cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

(a) The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

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(b) The Techstream records freeze frame data in 5 different instances: 1) 3 times before the DTC is stored, 2) once when the DTC is stored, and 3) once after the DTC is stored. These sets of data can be used to simulate the vehicle condition around the time when the malfunction occurred. The data may help in finding the cause of the malfunction, or in judging if the DTC was caused by a temporary malfunction.



5. DLC3 (Data Link Connector 3)

(a) Check the DLC3 INFO .

6. BATTERY VOLTAGE

Standard Voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

7. MIL (Malfunction Indicator Lamp)

(a) The MIL illuminates when the turning the ignition switch to ON (the engine is not running).

(b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL does not illuminate when the turning the ignition switch to ON, check the MIL circuit INFO .

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Last Modified: 11-13-2015	6.6 S	**Doc ID:** RM000000W710R1X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DIAGNOSTIC TROUBLE CODE CHART; 2016 MY Tacoma [08/2015 -]		

DIAGNOSTIC TROUBLE CODE CHART

- If a DTC is displayed during the DTC check, check the parts listed in the table below and proceed to the "See page" given.
- *1: "Comes on" means the Malfunction Indicator Lamp (MIL) illuminates.
- *2: "DTC stored" means the ECM memorizes the trouble code if the ECM detects the DTC detection condition.
- These DTCs may be output when the clutches, brakes, gear components, etc., inside the automatic transmission are damaged.

Automatic Transmission System

DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P0705	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	Comes on	DTC stored	INFO
P0711	Transmission Fluid Temperature Sensor "A" Performance	Comes on	DTC stored	INFO
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input	Comes on	DTC stored	INFO
P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input	Comes on	DTC stored	INFO
P0717	Input Speed Sensor Circuit No Signal	Comes on	DTC stored	INFO
P0722	Output Speed Sensor Circuit No Signal	Comes on	DTC stored	INFO
P0741	Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL)	Comes on	DTC stored	INFO
P0746	Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1)	Comes on	DTC stored	INFO
P0748	Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)	Comes on	DTC stored	INFO
P0776	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)	Comes on	DTC stored	INFO
P0778	Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)	Comes on	DTC stored	INFO
P077C	Output Speed Sensor Circuit Low	Comes on	DTC stored	INFO
P077D	Output Speed Sensor Circuit High	Comes on	DTC stored	INFO

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DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P0796	Pressure Control Solenoid "C" Performance (Shift Solenoid Valve SL3)	Comes on	DTC stored	INFO
P0798	Pressure Control Solenoid "C" Electrical (Shift Solenoid Valve SL3)	Comes on	DTC stored	INFO
P07BF	Input/Turbine Speed Sensor "A" Circuit Low	Comes on	DTC stored	INFO
P07C0	Input/Turbine Speed Sensor "A" Circuit High	Comes on	DTC stored	INFO
P2714	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)	Comes on	DTC stored	INFO
P2716	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)	Comes on	DTC stored	INFO
P2742	Transmission Fluid Temperature Sensor "B" Circuit Low Input	-	DTC stored	INFO
P2743	Transmission Fluid Temperature Sensor "B" Circuit High Input	-	DTC stored	INFO
P2757	Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU)	Comes on	DTC stored	INFO
P2759	Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU)	Comes on	DTC stored	INFO
P2769	Short in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)	Comes on	DTC stored	INFO
P2770	Open in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)	Comes on	DTC stored	INFO
P2808	Pressure Control Solenoid "G" Performance (Shift Solenoid Valve SL4)	Comes on	DTC stored	INFO
P2810	Pressure Control Solenoid "G" Electrical (Shift Solenoid Valve SL4)	Comes on	DTC stored	INFO

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7712PX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DTC CHECK / CLEAR; 2016 MY Tacoma [08/2015 -]		

DTC CHECK / CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are cleared. Before changing modes, always check and make a note of DTCs and freeze frame data.

HINT:

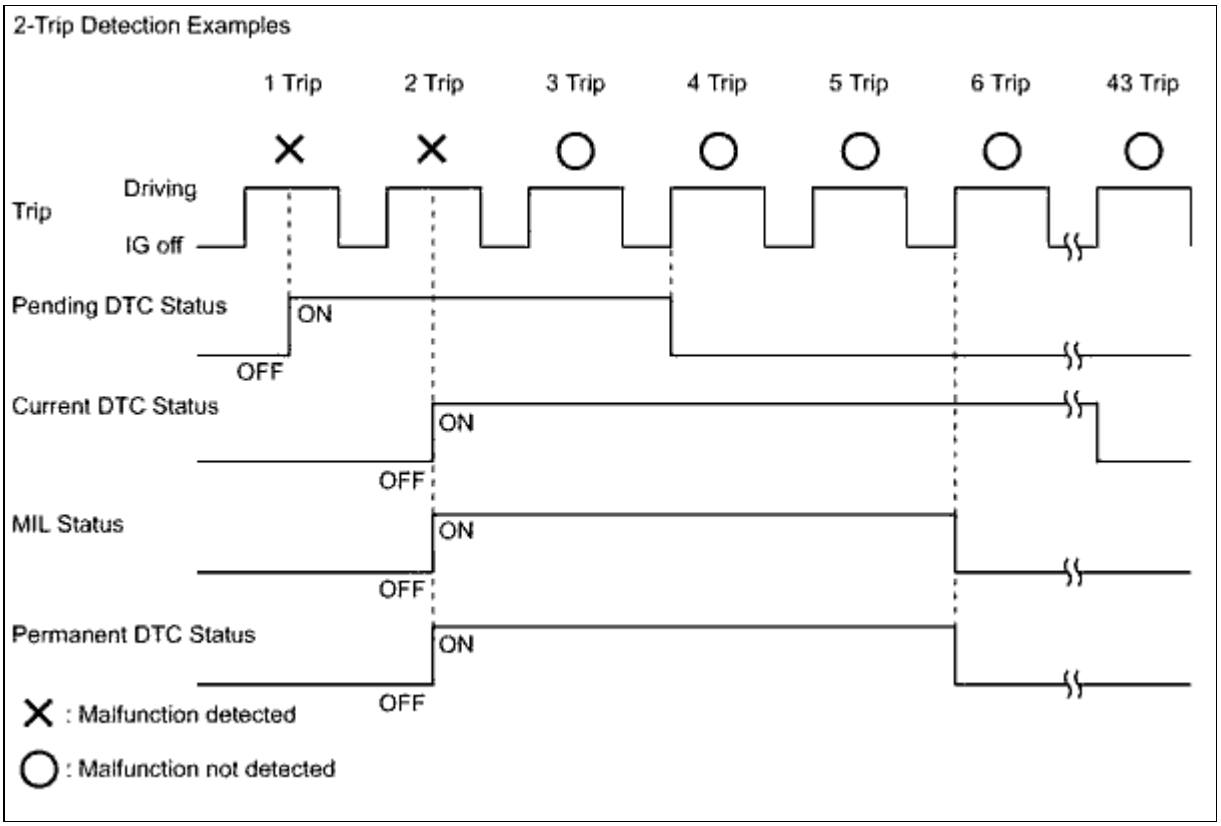
- DTCs which are stored in the ECM can be displayed on the Techstream. The Techstream can display current, pending and permanent DTCs.
- If a malfunction is detected during the current driving cycle, current and permanent DTCs are stored.
- Some DTCs are not stored if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- Current and pending DTCs can be cleared by using the Techstream or by disconnecting the cable from the negative battery terminal. However, permanent DTCs cannot be cleared using either of these two methods.
- After clearing current DTCs using the Techstream (or by disconnecting the cable from the negative battery terminal), permanent DTCs can be cleared when the system is determined to be normal for the relevant DTCs and then the universal trip is performed.

2 Trip Detection Examples

Pending DTC	Store condition	Malfunction detected
	Clear condition	System determined to be normal or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Current DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	No malfunctions in 40 driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Permanent DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	Ignition switch to ON after no malfunction is detected in 3 consecutive driving cycles or After DTCs cleared using Techstream or cable disconnected from negative battery terminal, malfunction not detected when universal trip driving performed
MIL	ON	Malfunction detected (2nd trip)

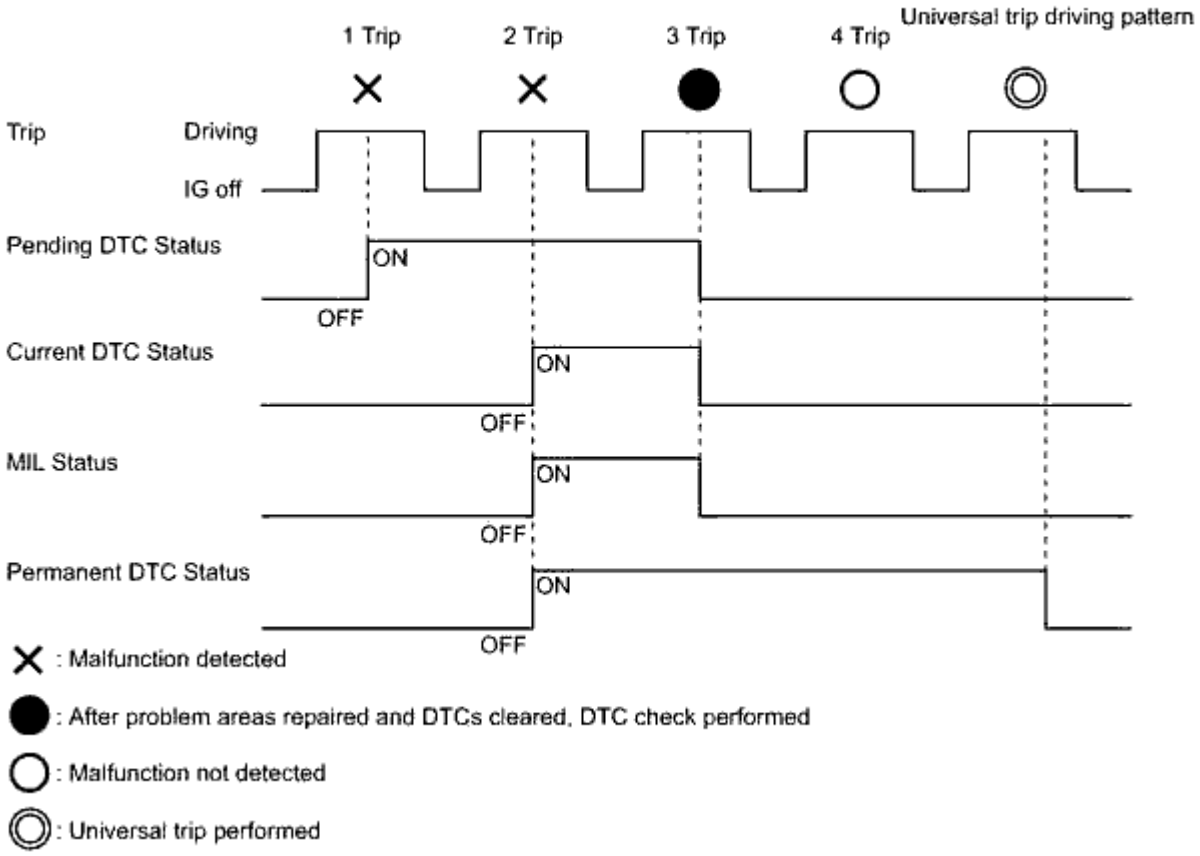
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	OFF	Ignition switch to ON after no malfunction is detected in 3 consecutive driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal



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2-Trip Detection Examples (Instance when DTCs were cleared midway through by using the Techstream or by disconnecting the cable from the negative battery terminal)



1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Check the DTC(s) and freeze frame data, and then write them down.

(f) Check the details of the DTC(s) INFO .

2. CLEAR DTC (Pending and Current DTC)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Clear the DTCs.

3. CLEAR PERMANENT DTC

HINT:

Even if the following procedure is not performed, permanent DTCs are cleared if no malfunction are detected during 3 consecutive driving cycles.

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

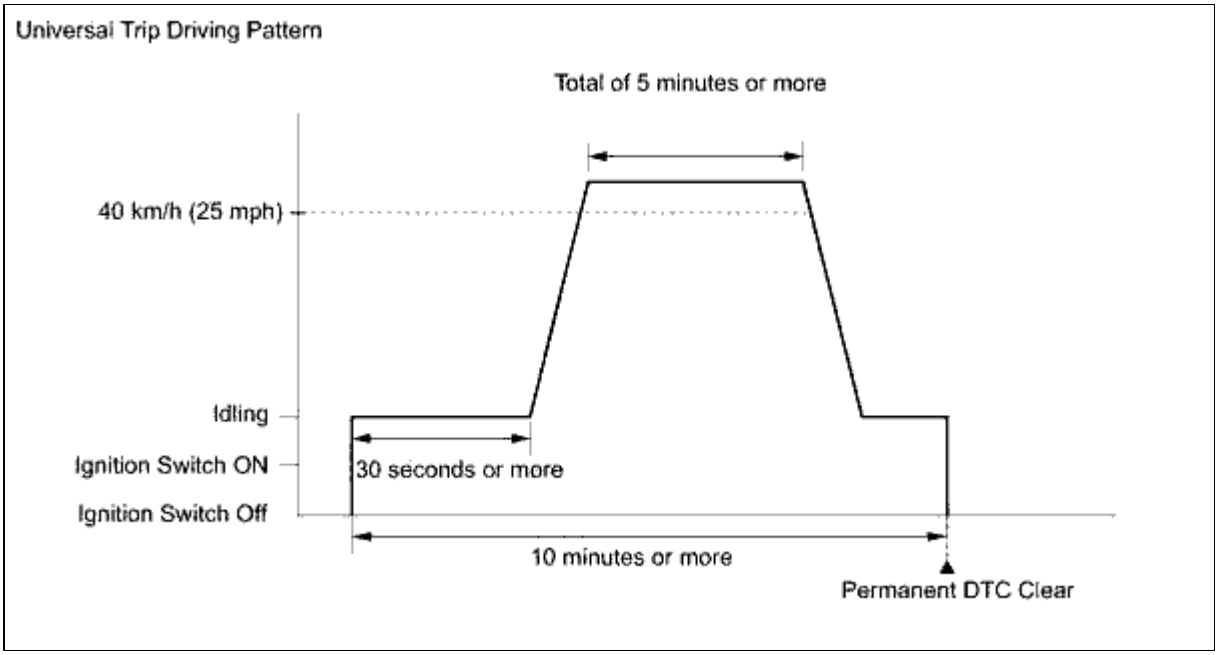
(e) Check if permanent DTCs are stored.

HINT:

If permanent DTCs are not output, it is not necessary to continue this procedure.

(f) Clear the DTCs.

(g) Perform the universal trip.



(1) Idle the engine for 30 seconds or more.

(2) Drive the vehicle at 40 km/h (25 mph) or more for a total of 5 minutes or more.

HINT:

- It is possible to complete the drive pattern even if the vehicle decelerates to less than 40 km/h (25 mph) during the driving cycle provided that the vehicle is driven at 40 km/h (25 mph) or more for a total of 5 minutes.
- When accelerating through the gears, make sure the vehicle is driven so all gears are used in order and no gears are skipped.

(3) Allow 10 minutes or more to elapse from the time the engine is started.

(h) Turn the ignition switch off.

(i) Wait 15 seconds.

(j) Turn the ignition switch to ON.

(k) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(l) Check that the permanent DTCs have been cleared.

HINT:

- If permanent DTCs have not been cleared, perform the universal trip again.
- Permanent DTCs are cleared when the universal trip is completed.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000O8L0TXX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): FAIL-SAFE CHART; 2016 MY Tacoma [08/2015 -]		

FAIL-SAFE CHART

1. Fail-safe

This function minimizes the loss of operation when any abnormality occurs in a sensor or solenoid.

Fail-safe Control List

MALFUNCTION PART	FUNCTION
Transmission revolution sensor (NT)	During a transmission revolution sensor (NT) malfunction, shift control is performed based on the transmission revolution sensor (SP2) signal.
Transmission revolution sensor (SP2)	During a transmission revolution sensor (SP2) malfunction, shift control is performed based on the wheel speed sensor signal.
ATF temperature sensors (No. 1 and No. 2)	During an ATF temperature sensor malfunction, up-shifting to 5th and 6th is prohibited.
Shift solenoid valve SL1, SL2, SL3 and SL4	Stop the conduction of electric power to a failed solenoid and shift gears by turning on/off normal solenoids. If all solenoids are malfunctioning, gears will be selected through mechanical hydraulic circuits.
Shift solenoid valve SLT	During a shift solenoid valve SLT malfunction, the current to the shift solenoid valve is stopped. However, shifting is performed through normal clutch pressure control.
Shift solenoid valve SLU	During a shift solenoid valve SLU malfunction, the current to the shift solenoid valve is stopped. This stops lock-up control, thus decreasing fuel economy.

Shift Solenoid Valve Operation when Normal

GEAR POSITION	1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

Fail-safe Control Chart

GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON Malfunction (without Fail-safe Control)*	1st	2nd	3rd	4th	4th	4th
	OFF Malfunction (without Fail-safe Control)	1st to N	2nd to N	3rd to N	4th to N	5th	6th
	Fail-safe Control during OFF Malfunction	Fixed in 3rd or 5th					

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GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL2	ON Malfunction (without Fail-safe Control)*	1st to 4th	2nd to 4th	3rd to 4th	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd	4th to 1st	5th to N	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 2nd or 3rd					
Shift solenoid valve SL3	ON Malfunction (without Fail-safe Control)*	1st to 2nd	2nd	3rd	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd to 1st	3rd	4th	5th	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 3rd					
Shift solenoid valve SL4	ON Malfunction (without Fail-safe Control)*	3rd	3rd	3rd	4th	5th	5th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd to 1st	4th	5th to N	6th
	Fail-safe Control during OFF Malfunction	Fixed in 2nd					

*: Fail-safe control is not actuated when an ON malfunction occurs.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W6Z17OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): HOW TO PROCEED WITH TROUBLESHOOTING; 2016 MY Tacoma [08/2015 -]		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The ECM of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN and multiplex communication system.
- *: Use the Techstream.

1.	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2.	**CUSTOMER PROBLEM ANALYSIS**

(a) Refer to the How to Troubleshoot ECU Controlled Systems in Introduction section INFO .

NEXT

3.	**INSPECT BATTERY VOLTAGE**

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

4.	**CONNECT TECHSTREAM TO DLC3***

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NEXT

5.	**CHECK AND CLEAR DTCS AND FREEZE FRAME DATA***

(a) Refer to DTC Check/Clear INFO .

NEXT

6.	**VISUAL INSPECTION**

NEXT

7.	**SELECT CHECK MODE DIAGNOSIS***

(a) Refer to Check Mode Procedure INFO .

NEXT

8.	**PROBLEM SYMPTOM CONFIRMATION**

(a) Refer to Road Test INFO .

Result

RESULT	PROCEED TO
Symptom does not occur	A
Symptom occurs	B

B **GO TO STEP 10**

A

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9.	**SYMPTOM SIMULATION**

(a) Refer to Symptom Simulation INFO .

NEXT

10.	**DTC CHECK***

(a) Refer to DTC Check/Clear INFO .

Result

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B **GO TO STEP 18**

A

11.	**BASIC INSPECTION**

(a) Refer to Park/Neutral Position Switch INFO .

(b) Refer to Shift Lever Assembly INFO .

NG **GO TO STEP 21**

OK

12.	**MECHANICAL SYSTEM TESTS**

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(a) Refer to Mechanical System Tests INFO .

NG ▶ **GO TO STEP 17**

OK ▼

13.	**HYDRAULIC TEST**

(a) Refer to Hydraulic Test INFO .

NG ▶ **GO TO STEP 17**

OK ▼

14.	**MANUAL SHIFTING TEST**

(a) Refer to Manual Shifting Test INFO .

NG ▶ **GO TO STEP 16**

OK ▼

15.	**PROBLEM SYMPTOMS TABLE CHAPTER 1**

(a) Refer to Problem Symptoms Table INFO .

NG ▶ **GO TO STEP 19**

OK ▼

16.	**PROBLEM SYMPTOMS TABLE CHAPTER 2**

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(a) Refer to Problem Symptoms Table INFO .

NEXT

17.	**COMPONENT INSPECTION**

NEXT **GO TO STEP 21**

18.	**DTC CHART**

(a) Refer to Diagnostic Trouble Code Chart INFO .

NEXT

19.	**CIRCUIT INSPECTION**

NEXT

20.	**IDENTIFICATION OF PROBLEM**

NEXT

21.	**REPAIR OR REPLACE**

NEXT

22.	**CONFIRMATION TEST**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7B0UQX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): HYDRAULIC TEST; 2016 MY Tacoma [08/2015 -]		

HYDRAULIC TEST

1. PERFORM HYDRAULIC TEST

(a) Measure the line pressure.

CAUTION:

The line pressure test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.
- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.
- When conducting stall test, do not continue for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(1) Warm up the ATF (Automatic Transmission Fluid).

(2) Turn the ignition switch off.

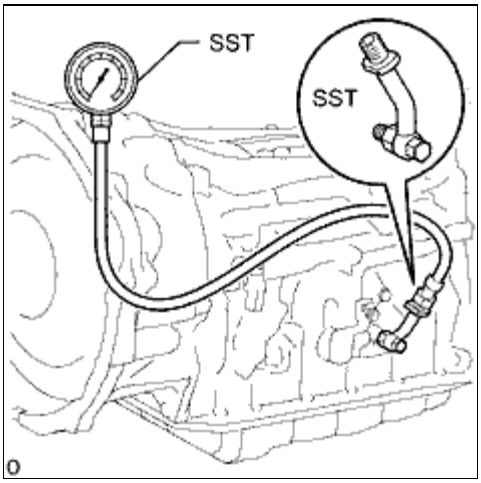
(3) Lift the vehicle up.

(4) Remove the test plug from the transmission case and connect SST.

SST: 09993-19015

09993-00010

09993-00040



(5) Lower the vehicle.

(6) Fully apply the parking brake and chock the 4 wheels.

(7) Start the engine and check the idling speed.

(8) Keep your left foot pressed firmly on the brake pedal and move the shift lever to D.

(9) Fully depress the accelerator pedal with your right foot. Quickly read the highest line pressure when the engine speed reaches the stall speed.

(10) In the same manner, perform the test with the shift lever in R.

Specified Line Pressure

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CONDITION	D POSITION	R POSITION
Stall speed	1450 to 1740 kPa (14.8 to 17.7 kgf/cm ^{2} , 210 to 252 psi)	1550 to 1840 kPa (15.8 to 18.8 kgf/cm ^{2} , 225 to 267 psi)

Evaluation

PROBLEM	POSSIBLE CAUSE
Measured values are higher than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective
Measured values are lower than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective • Oil pump defective
Pressure is low in D position only	• D position circuit fluid leak • No. 1 clutch (C1) defective
Pressure is low in R position only	• R position circuit fluid leak • No. 2 brake (B2) defective • No. 3 brake (B3) defective

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7F0S8X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): INITIALIZATION; 2016 MY Tacoma [08/2015 -]		

INITIALIZATION

1. RESET MEMORY

NOTICE:

- Perform Reset Memory (AT initialization) when replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves.
- Reset Memory can be performed only with the Techstream.

HINT:

The ECM memorizes the vehicle conditions when the ECT controls the automatic transmission assembly and transmission valve body assembly. Therefore, when the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

The reset procedure is as follows.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Utility / Reset Memory.

NOTICE:

After performing Reset Memory, be sure to perform the Road Test INFO described earlier.

HINT:

The ECM learns through the Road Test.

2. ATF THERMAL DEGRADATION ESTIMATE RESET

NOTICE:

If either of the following conditions is met, perform ATF Thermal Degradation Estimate Reset.

- The ATF has been replaced.

  HINT:

  If 50000 or more is displayed for the Data List item "ATF Thermal Degradation Estimate", thermal degradation of the ATF is suspected. Perform ATF Thermal Degradation Estimate Reset after replacing the ATF.

- Approximately 50% or more of the ATF has been replaced during a repair of the transmission or a similar operation.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

NOTICE:

Do not start the engine.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Utility / ATF Thermal Degradation Estimate

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Reset.

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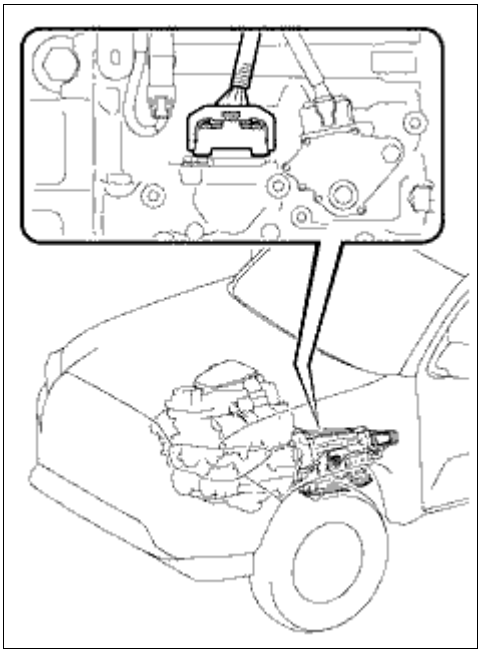
Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7C10SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): MANUAL SHIFTING TEST; 2016 MY Tacoma [08/2015 -]		

MANUAL SHIFTING TEST

1. PERFORM MANUAL SHIFTING TEST

HINT:

- Using this test, it can be determined whether a problem is in an electrical circuit or if it is a mechanical problem in the transmission.
- If any abnormalities are found in the following test, the problem is in the transmission itself.



(a) Disconnect the connector of the transmission wire.

HINT:

It is possible to deactivate the electrical shift control by disconnecting the transmission wire. The gears can then be changed mechanically with the shift lever.

(b) Drive the vehicle with the transmission wire disconnected. Move the shift lever to each position to check whether the gear changes as shown in the table below.

SHIFT LEVER POSITION	GEAR
P	P
R	R
D	3rd

(c) Connect the connector of the transmission wire.

(d) Clear the DTCs INFO .

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7A0W1X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): MECHANICAL SYSTEM TESTS; 2016 MY Tacoma [08/2015 -]		

MECHANICAL SYSTEM TESTS

1. STALL SPEED TEST

HINT:

This test is to check the overall performance of the engine and transmission.

CAUTION:

- This test should be done on a paved surface (a surface that is not slippery).
- To ensure safety, perform this test in an open and level area that provides good traction.
- The stall speed test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Do not perform the stall speed test for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Chock all 4 wheels.

(h) Set the parking brake and keep the brake pedal depressed firmly with your left foot.

(i) Move the shift lever to D.

(j) Depress the accelerator pedal as much as possible with your right foot.

(k) Read the engine speed (stall speed) and release the accelerator pedal immediately.

Standard value:

STALL SPEED	
1990 rpm	+ 200 rpm
	- 200 rpm

Evaluation

TEST RESULT	POSSIBLE CAUSE
Stall speed is lower than standard value	• Engine power output may be insufficient • Stator one-way clutch is not operating properly • Torque converter assembly is faulty (stall speed is less than standard value by 600 rpm or more)

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TEST RESULT	POSSIBLE CAUSE
Stall speed is higher than standard value	• Line pressure is too low • No. 1 clutch (C1) is slipping • No. 3 one-way clutch (F3) is not operating properly • Improper fluid level

2. SHIFT TIME LAG TEST

HINT:

When the shift lever is moved while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the clutch, and brake.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Set the parking brake and keep the brake pedal depressed firmly.

(h) Check the D position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to D and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

(i) Check the R position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to R and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

Standard value:
D position time lag is less than 1.2 seconds
R position time lag is less than 1.5 seconds

Evaluation

TEST RESULT	POSSIBLE CAUSE
D position time lag exceeds standard value	• Line pressure is too low • No. 1 clutch (C1) is worn • No. 3 one-way clutch (F3) is not operating properly
R position time lag exceeds standard value	• Line pressure is too low • No. 2 brake (B2) is worn • No. 3 brake (B3) is worn

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7K0W0X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): MONITOR DRIVE PATTERN; 2016 MY Tacoma [08/2015 -]		

MONITOR DRIVE PATTERN

1. TEST MONITOR DRIVE PATTERN FOR ECT

CAUTION:

Perform this drive pattern on a level surface and strictly observe the posted speed limits and traffic laws while driving.

HINT:

Performing this drive pattern is one method to simulate the ECM (ECT) malfunction detection conditions.

Some DTCs may not be detected through ordinary, everyday driving. Also, DTCs may not be detected through this drive pattern.

(a) Preparation for driving

(1) Warm up the engine sufficiently (engine coolant temperature is 60°C (140°F) or higher).

(2) Drive the vehicle when the atmospheric temperature is -10°C (14°F) or higher.

Some malfunctions are not detected when the atmospheric temperature is below -10°C (14°F).

(b) Drive pattern

(1) Drive the vehicle through all the gears.

Stop → 1st → 2nd → 3rd → 4th → 5th → 6th → 6th (lock-up ON).

(2) Perform an engine brake test with the shift lever in S. While driving in the S6 range and 6th gear lock-up, move the shift lever to "-" and down-shift from 6th → 5th, 5th → 4th, 4th → 3rd, 3rd → 2nd and 2nd → 1st.

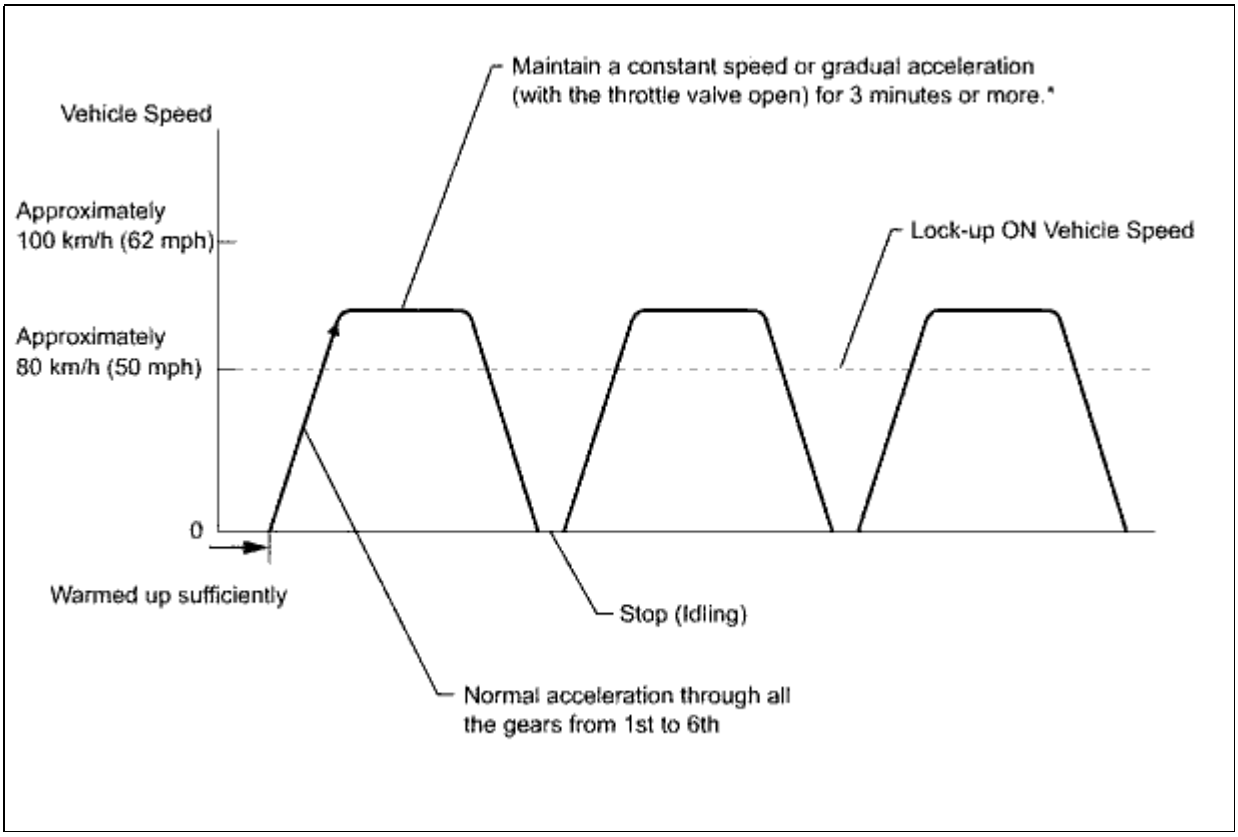
Check that engine braking is normal for every down-shift.

(3) Repeat the above drive pattern three times or more.

NOTICE:

- When using the Techstream, the monitor status can be checked in the Data List INFO .
- In the event that the drive pattern must be interrupted (due to traffic conditions or other factors), the drive pattern can be resumed and, in most cases, the monitor can be completed.

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HINT:

*: Drive the vehicle at a speed in top gear that will cause lock-up to engage. The vehicle can be driven at a speed lower than that in the above diagram under the lock-up condition.

NOTICE:

It is necessary to drive the vehicle for approximately 30 minutes to detect DTC P0711 (No. 1 ATF temperature sensor malfunction).

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8417ZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0705; Transmission Range Sensor Circuit Malfunction (PRNDL Input); 2016 MY Tacoma [08/2015 -]		

DTC	**P0705**	**Transmission Range Sensor Circuit Malfunction (PRNDL Input)**

DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0705	One of the following conditions is met: (A) Any 2 or more of the following signals are ON simultaneously (2 trip detection logic): • One of the following conditions is met. ○ P input signal is ON ○ N input signal is ON ○ NSW input signal is ON • R input signal • D input signal (B) Any of the following signals is ON for 2.0 seconds or more with the shift lever in S (2 trip detection logic): • P input signal • N input signal • NSW input signal • R input signal (C) All signals are OFF simultaneously for NSW, P, R, N and D (2 trip detection logic).	• Open or short in park/neutral position switch circuit • Transmission control switch (transmission floor shift assembly) • Park/neutral position switch • ECM

MONITOR DESCRIPTION

This DTC indicates a problem with the park/neutral position switch and the wire harness in the park/neutral position switch circuit.

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

For safety, the park/neutral position switch detects the shift lever position so that the engine can be started only when the shift lever is in P or N.

The park/neutral position switch sends a signal to the ECM according to the shift lever position (P, R, N, D or S). The ECM determines that there is a problem with the switch or related parts if it receives more than 1 position signal simultaneously. The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

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Related DTCs	P0705: Park/neutral position switch/Verify switch input
Required sensors/Components	Park/neutral position switch
Frequency of operation	Continuous
Duration	Condition (A) and (B) 2 sec. Condition (C) 60 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not stored	None
Ignition switch	ON
Battery voltage	10.5 V or more
Starter	off

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A)

Any two of the following conditions are met:	Conditions 1, 2 and 3
1. One of the following conditions is met:	Conditions (a), (b) or (c)
(a). P position switch	ON
(b). Park/neutral position switch (NSW)	ON
(c). N position switch	ON
2. R position switch	ON
3. D position switch	ON

Condition (B)

With the shift lever is S, one of the following conditions is met

P position switch	ON
N position switch	ON
Park/neutral position switch (NSW)	ON
R position switch	ON

Condition (C)

All of the following conditions are met

P position switch	OFF

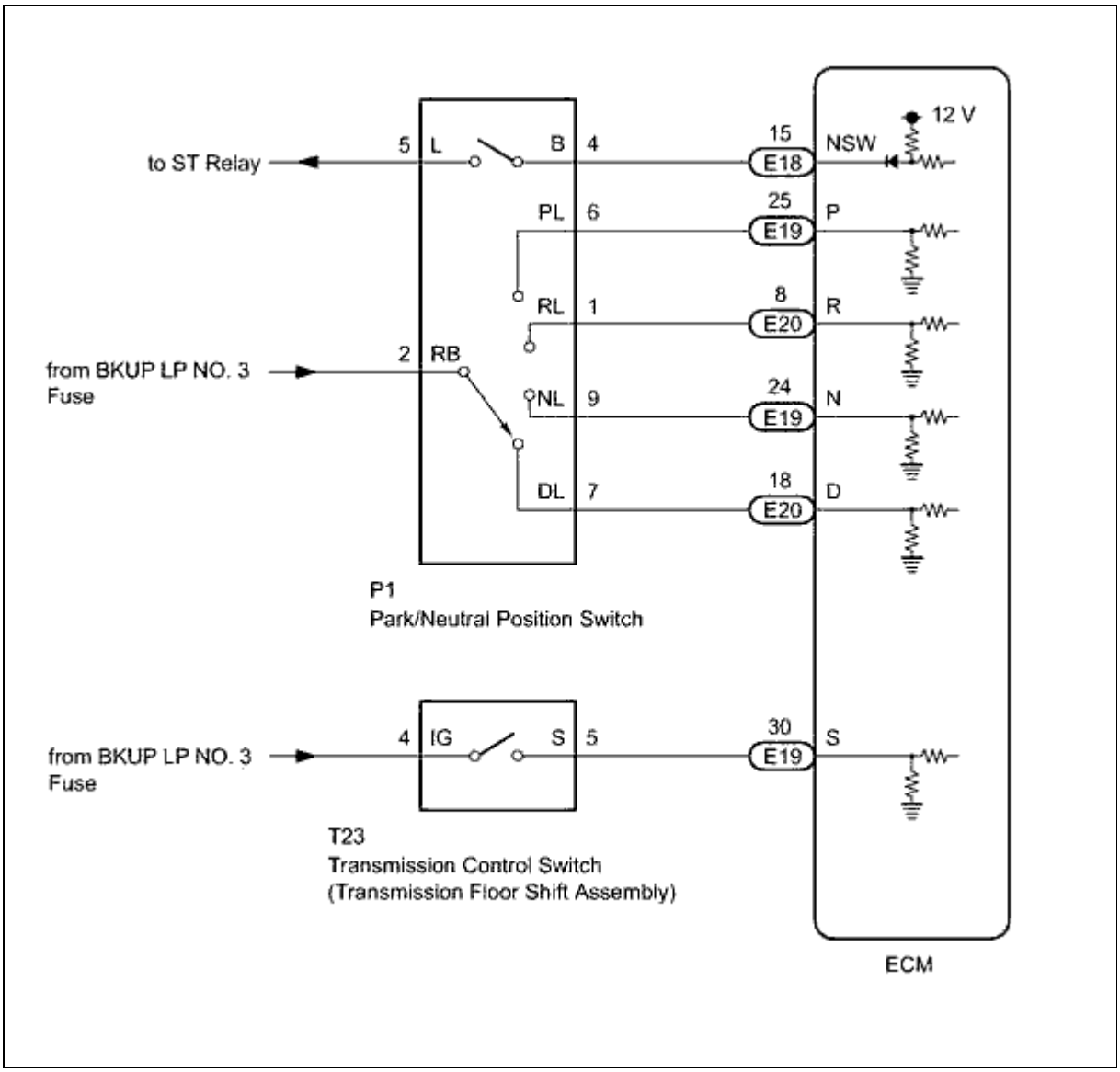
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N position switch	OFF
Park/neutral position switch (NSW)	OFF
R position switch	OFF
D position switch	OFF

COMPONENT OPERATING RANGE

Park/neutral position switch	The park/neutral position switch sends only one signal to the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

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- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the ignition switch to ON.*1
2. Wait with the shift lever in each position (P, R, N and D) for 60 seconds or more.*2
3. Wait for 2 seconds or more with the shift lever in S.*3
4. Turn the ignition switch off.
5. Perform steps (*1) through (*3) again.
6. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Neutral Position SW Signal	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P • OFF: Shift lever not in P	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.

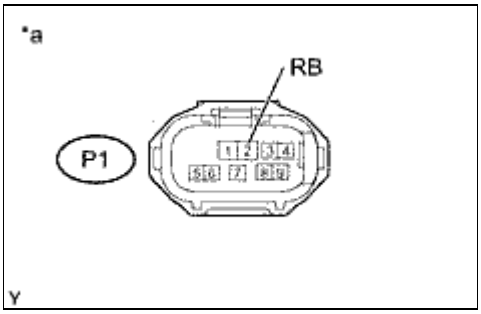
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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
		R	
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.

PROCEDURE

1.	**CHECK HARNESS AND CONNECTOR (BATTERY - PARK/NEUTRAL POSITION SWITCH)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-2 (RB) - Body ground	Ignition switch ON	11 to 14 V
P1-2 (RB) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

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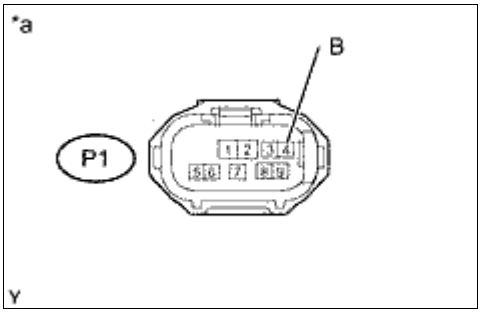
*a	Front view of wire harness connector (to Park/Neutral Position Switch)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

2.	**CHECK HARNESS AND CONNECTOR (NSW TERMINAL VOLTAGE)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-4 (B) - Body ground	Ignition switch ON	11 to 14 V
P1-4 (B) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

*a	Front view of wire harness connector (to Park/Neutral Position Switch)

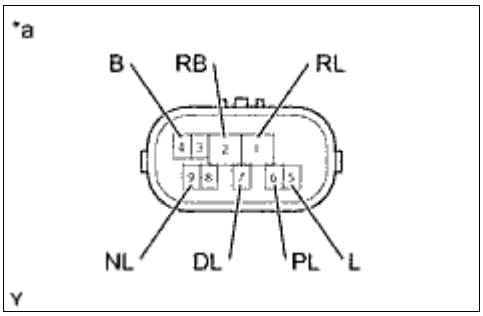
NG ▶ **GO TO STEP 7**

OK
▼

3.	**INSPECT PARK/NEUTRAL POSITION SWITCH**

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(a) Disconnect the P1 park/neutral position switch connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (B) - 5 (L)	Shift lever in P or N	Below 1 Ω
2 (RB) - 6 (PL)	Shift lever in P	Below 1 Ω
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
2 (RB) - 9 (NL)	Shift lever in N	Below 1 Ω
2 (RB) - 7 (DL)	Shift lever in D, S, "+" or "-"	Below 1 Ω
4 (B) - 5 (L)	Shift lever not in P or N	10 kΩ or higher
2 (RB) - 6 (PL)	Shift lever not in P	10 kΩ or higher
2 (RB) - 1 (RL)	Shift lever not in R	10 kΩ or higher
2 (RB) - 9 (NL)	Shift lever not in N	10 kΩ or higher
2 (RB) - 7 (DL)	Shift lever not in D, S, "+" or "-"	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Park/Neutral Position Switch)

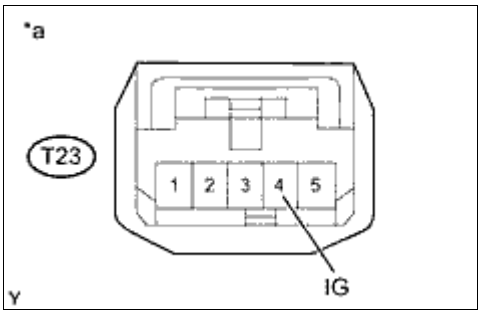
NG ▶ **REPLACE PARK/NEUTRAL POSITION SWITCH**

OK
▼

4.	**CHECK HARNESS AND CONNECTOR (BATTERY - TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY))**

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(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T23-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
T23-4 (IG) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

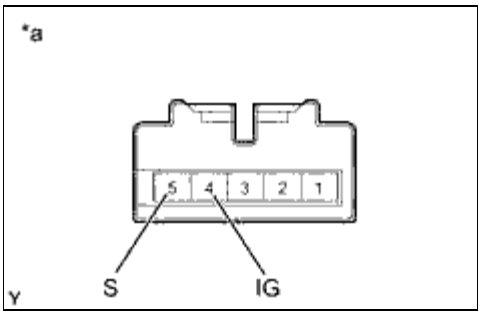
*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

5.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "-"	Below 1 Ω

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever not in S, "+" or "-"	10 kΩ or higher

Text in Illustration

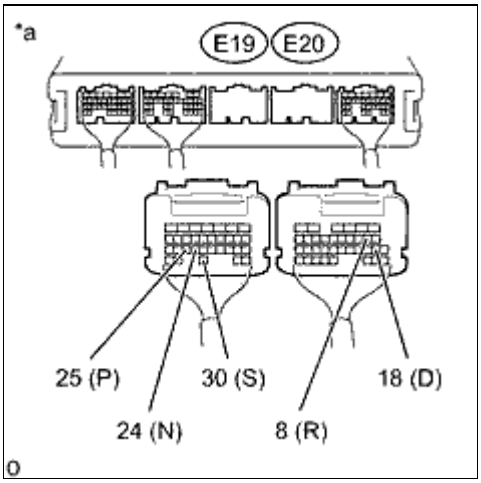
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

6.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH, TRANSMISSION CONTROL SWITCH - ECM)**

(a) Disconnect the ECM connectors.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-25 (P) - Body ground	• Ignition switch ON • Shift lever in P	11 to 14 V
E20-8 (R) - Body ground	• Ignition switch ON • Shift lever in R	11 to 14 V*

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-24 (N) - Body ground	• Ignition switch ON • Shift lever in N	11 to 14 V
E20-18 (D) - Body ground	• Ignition switch ON • Shift lever in D, S, "+" or "-"	11 to 14 V
E19-30 (S) - Body ground	• Ignition switch ON • Shift lever in S, "+" or "-"	11 to 14 V
E19-25 (P) - Body ground	• Ignition switch ON • Shift lever not in P	Below 1 V
E20-8 (R) - Body ground	• Ignition switch ON • Shift lever not in R	Below 1 V
E19-24 (N) - Body ground	• Ignition switch ON • Shift lever not in N	Below 1 V
E20-18 (D) - Body ground	• Ignition switch ON • Shift lever not in D, S, "+" or "-"	Below 1 V
E19-30 (S) - Body ground	• Ignition switch ON • Shift lever not in S, "+" or "-"	Below 1 V

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

HINT:

*: The voltage will drop slightly due to lighting up of the backup light.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

7.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)**

(a) Disconnect the P1 park/neutral position switch connector.

(b) Disconnect the E18 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P1-4 (B) - E18-15 (NSW)	Always	Below 1 Ω
P1-4 (B) or E18-15 (NSW) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W7Z0SRX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0711; Transmission Fluid Temperature Sensor "A" Performance; 2016 MY Tacoma [08/2015 -]		

DTC	**P0711**	**Transmission Fluid Temperature Sensor "A" Performance**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0711	Either condition is met: (2 trip detection logic) • (a) Certain monitor enabling conditions are met and the No. 1 ATF temperature is below 20°C (68°F) • (b) Certain monitor enabling conditions are met and the No. 1 ATF temperature is 110°C (230°F) or higher	No. 1 ATF temperature sensor (transmission wire)

MONITOR DESCRIPTION

This DTC indicates that there is a problem with output signals from the No. 1 ATF temperature sensor and that the sensor itself is defective. The No. 1 ATF temperature sensor converts the ATF temperature into an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit or a fault of the No. 1 ATF temperature sensor.

After running the vehicle for a certain period, the ATF temperature should increase. If the ATF temperature is below 20°C (68°F) after running the vehicle for a certain period, the ECM interprets this as a malfunction, illuminates the MIL and stores the DTC.

When the ATF temperature is 110°C (230°F) or higher and the engine coolant temperature takes 10 seconds or more to reach 60°C (140°F) after a cold start, the ECM also determines this as a malfunction, illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0711: ATF temperature sensor/Rationality check
Required sensors/Components	ATF temperature sensor (TFT sensor)

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Frequency of operation	Continuous
Duration	Condition (A), (B), (C) and (D): 3 sec. Condition (E): Continuous
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0112, P0113 (IAT (Intake air temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system) P2610 (Soak timer circuit)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
IAT (Intake air temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Soak timer circuit	Not circuit malfunction

Condition (A):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	10 min. or more
Accumulated driving time*1	100 sec. or more
Driving distance after engine start*3	4.9 km (3.04 miles) or more
IAT*4	15°C (59°F) or higher
ECT (12 sec. after engine start)	15°C (59°F) or higher
Soak time	5 hours or more

Condition (B):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	39 min. or more
Accumulated driving time*1	231 sec. or more
Driving distance after engine start*3	16 km (9.9 miles) or more
IAT*4	-10°C (14°F) or higher
ECT (12 sec. after engine start)	-10°C (14°F) or higher

Condition (C):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	30 min. or more
Accumulated driving time*1	400 sec. or more
Driving distance after engine start*3	16 km (9.9 miles) or more
IAT*4	-15°C (5°F) or higher
ECT (12 sec. after engine start)	-15°C (5°F) or higher

Condition (D):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	55 min. or more
Accumulated driving time*1	750 sec. or more
Driving distance after engine start*3	27 km (16.8 miles) or more

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Condition (E):

Time after ECT reaches 60°C (140°F)	10 sec. or more
ATF temperature (12 sec. after engine start)	110°C (230°F) or higher
ECT (12 sec. after engine start)	Below 35°C (95°F)

HINT:

*1: Following conditions are met

Engine speed - Turbine speed	50 rpm or more
Output speed	400 rpm or more
Throttle valve opening angle	5% or more
Shift position	Not "N" or "P"
Engine	Running
However, accumulated driving time is cleared	-
When following condition met	-
Duration time from shifting to "N" or "P"	300 sec. or more

*2: Time after engine start is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*3: Driving distance is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*4: IAT is measured when either of following conditions met

12 sec. after engine start	-
Duration time from shifting to "N" or "P"	300 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

When either condition below is met: Condition (A), (B), (C) and (D) or (E)

Condition (A), (B), (C) and (D):

ATF temperature	Below 20°C (68°F)

Condition (E):

ATF temperature	110°C (230°F) or higher

COMPONENT OPERATING RANGE

ATF temperature	20°C (68°F) or higher, and Below 110°C (230°F)

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.*1
2. Drive the vehicle 27 km (16.8 miles) or more over a period of 12 minutes and 30 seconds or more.*2
3. After 55 minutes or more have elapsed since performing step (*1), turn the ignition switch off.*3
4. Perform steps (*1) through (*3) again.
5. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P0712 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P0713 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

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TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

If a circuit related to the No. 1 ATF temperature sensor becomes open, P0713 is immediately stored (in 0.5 seconds). When P0713 is stored, P0711 cannot be stored.

It is not necessary to inspect the circuit when P0711 is stored.

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0711)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0711 is output	A
P0711 and other DTCs are output	B

HINT:

If any other codes besides P0711 are output, perform troubleshooting for those DTCs first.

B ▶ **GO TO DTC CHART**

A ▼

2.	**CHECK TRANSMISSION FLUID LEVEL**

(a) Check the transmission fluid level INFO .

OK:

Automatic transmission fluid level is correct.

NG ▶ **ADJUST FLUID LEVEL**

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OK ▶ REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W850UAX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0712,P0713; Transmission Fluid Temperature Sensor "A" Circuit Low Input; 2016 MY Tacoma [08/2015 -]		

DTC	**P0712**	**Transmission Fluid Temperature Sensor "A" Circuit Low Input**

DTC	**P0713**	**Transmission Fluid Temperature Sensor "A" Circuit High Input**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0712	The output voltage from the ATF temperature sensor is below 0.14 V for 0.5 sec. or more (1 trip detection logic).	• Short in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM
P0713	The output voltage from the ATF temperature sensor is higher than 4.91 V for 0.5 sec. or more, and either condition is met (1 trip detection logic): (A) 600 sec. or more have elapsed after the engine start when engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 sec. or more have elapsed after the engine start when engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM

MONITOR DESCRIPTION

The No. 1 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit. If the resistance value of the No. 1 ATF temperature sensor is below 79 Ω*1 or higher than 156 kΩ*2, the ECM interprets this as a fault in the No. 1 ATF temperature sensor or wiring. The ECM will illuminate the MIL and store the DTC.

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*1: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

*2: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

MONITOR STRATEGY

Related DTCs	P0712: ATF temperature sensor/Range check (Low voltage) P0713: ATF temperature sensor/Range check (High voltage)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

P0712:

The monitor will run whenever the following DTCs are not stored	None

P0713:

Either condition is met: Condition (A) or (B)

Condition (A):

The monitor will run whenever the following DTCs are not stored	P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit fail) P00AC, P00AD, P0112, P0113 (IAT (Intake air temperature) sensor circuit fail)
Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	-29.375°C (-20.875°F) or less
Time after engine start	600 sec. or more
ECT (Engine coolant temperature) sensor circuit fail (P0115, P0117, P0118)	Not detected
IAT (Intake air temperature) sensor circuit fail (P00AC, P00AD, P0112, P0113)	Not detected

Condition (B):

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The monitor will run whenever the following DTCs are not stored	P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit fail) P00AC, P00AD, P0112, P0113 (IAT (Intake air temperature) sensor circuit fail)
Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	Higher than -29.375°C (-20.875°F)
Time after engine start	10 sec. or more
ECT (Engine coolant temperature) sensor circuit fail (P0115, P0117, P0118)	Not detected
IAT (Intake air temperature) sensor circuit fail (P00AC, P00AD, P0112, P0113)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0712:

ATF temperature sensor voltage (ATF temperature)	Below 0.14 V (Higher than 164°C (327°F))

P0713:

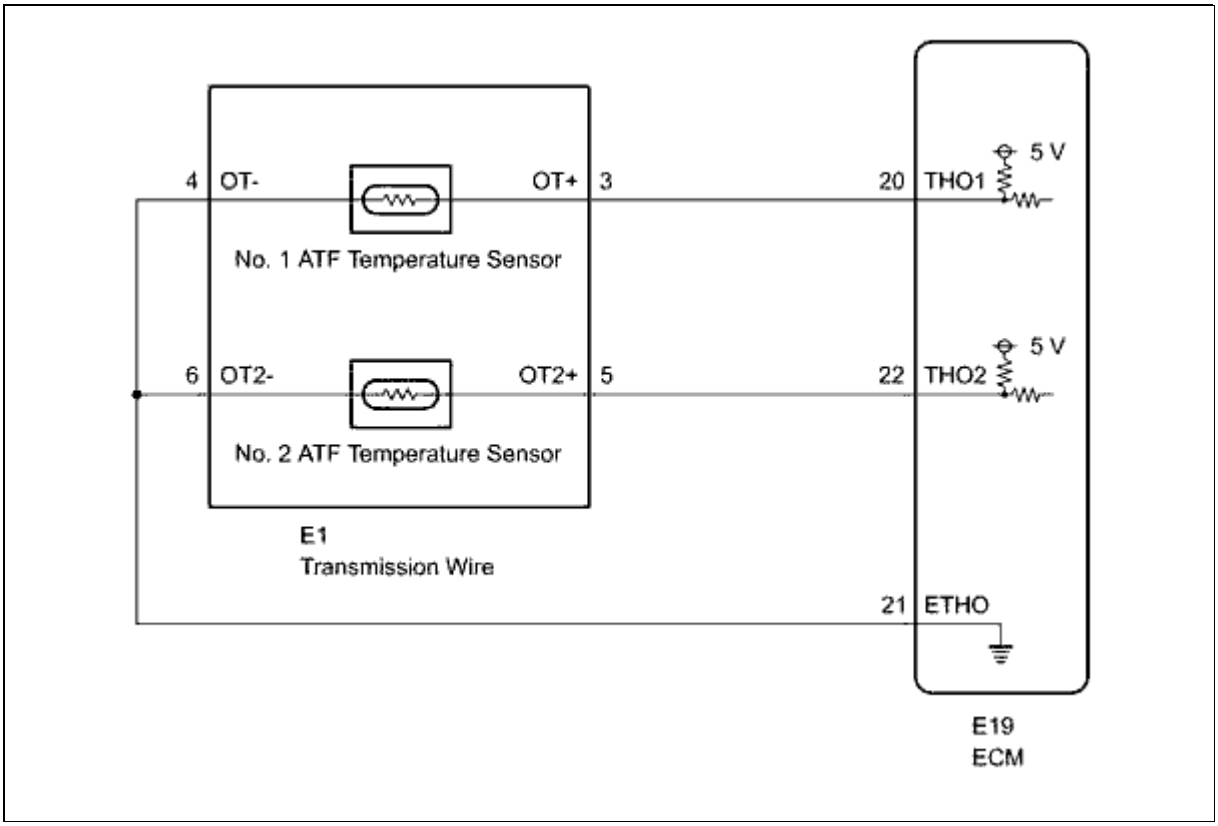
ATF temperature sensor voltage (ATF temperature)	Higher than 4.91 V (Below -48°C (-54°F))

COMPONENT OPERATING RANGE

ATF temperature sensor voltage (ATF temperature)	0.14 V or higher, and 4.91 V or less (-48°C (-54°F) or higher, and 164°C (327°F) or less)

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 10 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

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(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P0712 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P0713 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

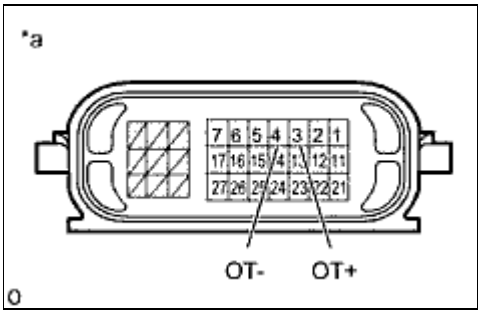
If the circuit related to the No. 1 ATF temperature sensor becomes open, P0713 is immediately stored (in 0.5 seconds). When P0713 is stored, P0711 cannot be stored.

It is not necessary to inspect the circuit when P0711 is stored.

PROCEDURE

1.	**INSPECT NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
3 (OT+) or 4 (OT-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

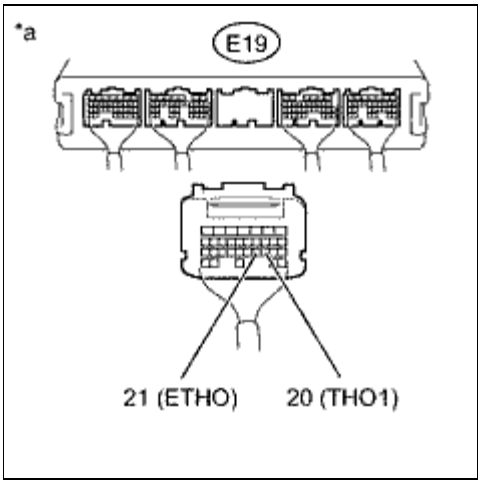
*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-20 (THO1) - E19-21 (ETHO)	Always	79 Ω to 156 kΩ
E19-20 (THO1) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000025K005OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0717,P07BF,P07C0; Input Speed Sensor Circuit No Signal; 2016 MY Tacoma [08/2015 -]		

DTC	**P0717**	**Input Speed Sensor Circuit No Signal**

DTC	**P07BF**	**Input/Turbine Speed Sensor "A" Circuit Low**

DTC	**P07C0**	**Input/Turbine Speed Sensor "A" Circuit High**

DESCRIPTION

This sensor detects the rotation speed of the turbine which shows the input turbine speed of the transmission. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0717	All conditions are met for 5 seconds or more (1 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Gear position is 2nd, 3rd, 4th, 5th or 6th. (c) Transmission output shaft speed is 1000 rpm or more. (d) The vehicle speed is 25 km/h (15.54 mph) or more. (e) Transmission revolution sensor (NT) value is less than 300 rpm.	• Harness or connector • Transmission revolution sensor (NT) • ECM
P07BF	When the transmission revolution sensor (NT) input voltage is below 0.1 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM
P07C0	When the transmission revolution sensor (NT) input voltage is higher than 1.9 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM

MONITOR DESCRIPTION

The transmission revolution sensor (NT) detects the transmission input shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

While the vehicle is operating in 2nd, 3rd, 4th, 5th or 6th gear with the shift lever in D, if the input shaft speed is less than 300 rpm*1 and the output shaft speed is more than 1000 rpm*2, the ECM interprets this as a fault,

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illuminates the MIL and stores the DTC.

*1: Pulse is not output or is irregularly output.

*2: The vehicle speed is 25 km/h (15.54 mph) or more.

MONITOR STRATEGY

Related DTCs	P0717: Transmission revolution sensor (NT)/Verify pulse input P07BF: Transmission revolution sensor (NT)/Range check (Low voltage) P07C0: Transmission revolution sensor (NT)/Range check (High voltage)
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P0717: 5 sec. P07BF and P07C0: 4.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

P0717:

The monitor will run whenever the following DTCs are not stored	P0746, P0748 (Shift solenoid valve SL1 circuit) P0776, P0778 (Shift solenoid valve SL2 circuit) P0796, P0798 (Shift solenoid valve SL3 circuit) P2808, P2810 (Shift solenoid valve SL4 circuit)
Park/neutral position switch (NSW)	OFF
Shift change	Shift change is completed before starting next shift change operation
ECM selected gear	Not 1st
Output shaft revolution	1000 rpm or more
R position switch	OFF
Engine	Running
Vehicle speed	25 km/h (15.54 mph) or more
Transmission range switch circuit fail (P0705)	Not detected
Turbine speed sensor range check fail (P07BF, P07C0)	Not detected

P07BF and P07C0:

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The monitor will run whenever the following DTCs are not stored	None
Turbine speed sensor pulse input fail (P0717)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0717:

Turbine speed sensor revolution	Less than 300 rpm

P07BF:

Turbine speed sensor voltage	Below 0.1 V

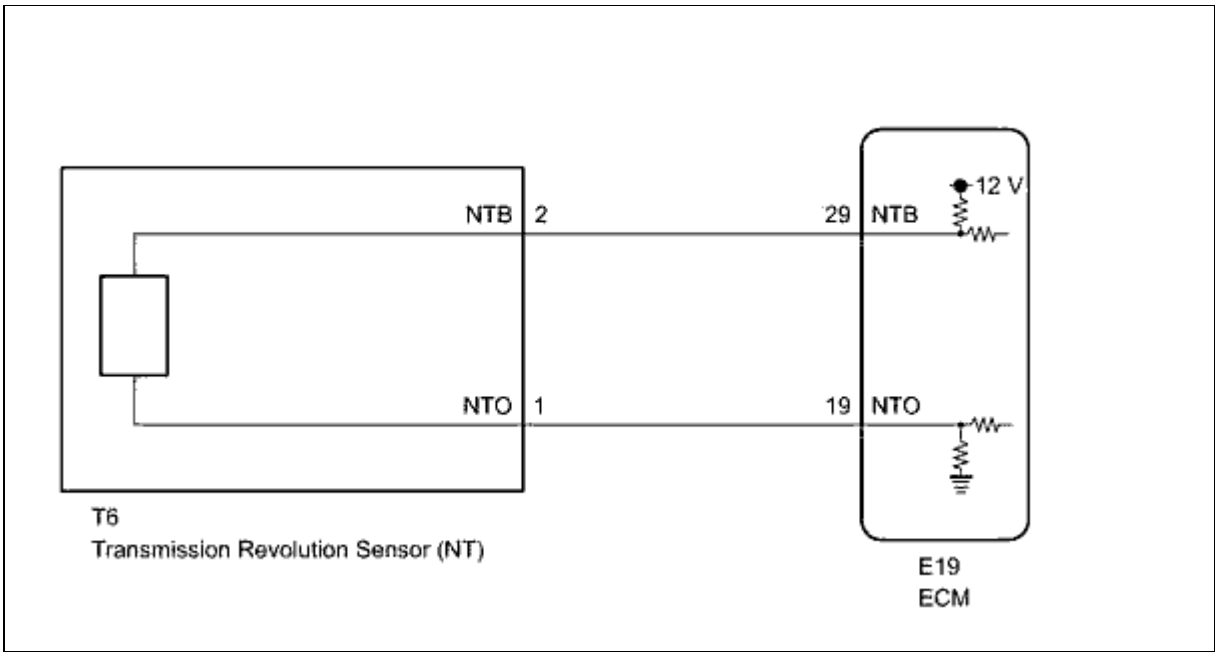
P07C0:

Turbine speed sensor voltage	Higher than 1.9 V

COMPONENT OPERATING RANGE

Transmission revolution sensor (NT)	Turbine speed is equal to engine speed with lock-up ON

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

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After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test and drive the vehicle for 5 seconds or more at 25 km/h (15.54 mph) or more INFO .
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (NT)	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm

HINT:

- SPD (NT) is always 0 while driving: Open or short in the sensor or circuit.
- SPD (NT) is always more than 0 and less than 300 rpm while driving the vehicle at 25 km/h (15.54 mph) or more: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPD (NT) AND NT SENSOR VOLTAGE)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

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(d) Enter the following menus: Powertrain / Engine and ECT / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (NT)	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

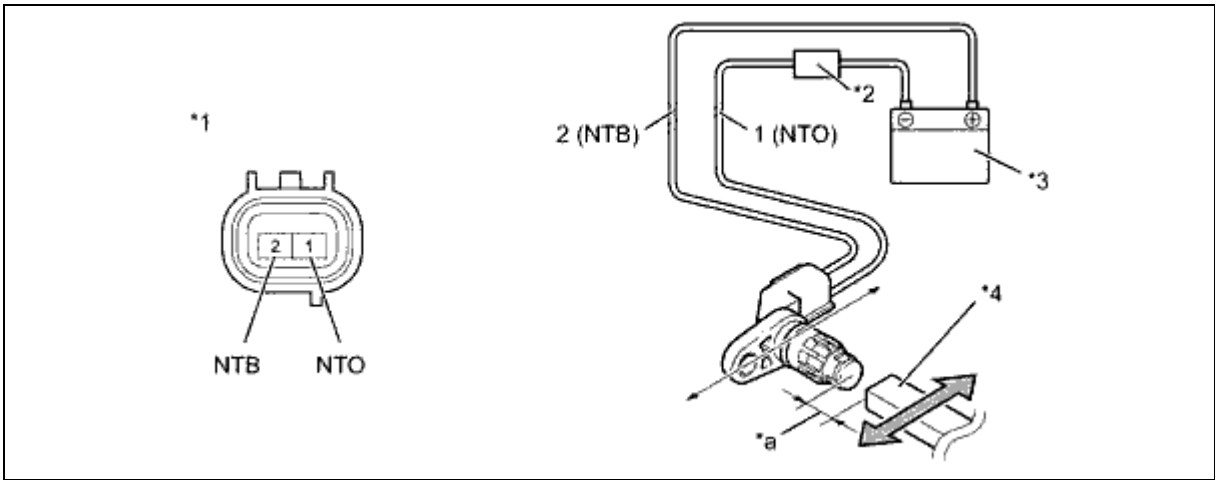
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (NT)**

(a) Remove the transmission revolution sensor (NT) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (NT)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (NT) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (NTO) - 2 (NTB)	Low signal	4 to 8 mA
1 (NTO) - 2 (NTB)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (NT)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (NT) - ECM)**

(a) Disconnect the T6 transmission revolution sensor (NT) connector.

(b) Disconnect the E19 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T6-2 (NTB) - E19-29 (NTB)	Always	Below 1 Ω
T6-1 (NTO) - E19-19 (NTO)	Always	Below 1 Ω
T6-2 (NTB) - Body ground	Always	10 kΩ or higher
T6-1 (NTO) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000003UR2021X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0722,P077C,P077D; Output Speed Sensor Circuit No Signal; 2016 MY Tacoma [08/2015 -]		

DTC	**P0722**	**Output Speed Sensor Circuit No Signal**

DTC	**P077C**	**Output Speed Sensor Circuit Low**

DTC	**P077D**	**Output Speed Sensor Circuit High**

DESCRIPTION

This sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
P0722	All conditions are met for 5 seconds or more (2 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Either condition is met. • Gear position is 1st: Transmission revolution sensor (NT) value is 1310 rpm or more. • Gear position is 2nd, 3rd, 4th, 5th or 6th: Transmission revolution sensor (NT) value is 760 rpm or more. (c) The vehicle speed is 8.99 km/h (5.59 mph) or more. (d) No signal from transmission revolution sensor (SP2) is input to the ECM.	• Harness or connector • Transmission revolution sensor (SP2) • ECM
P077C	When the transmission revolution sensor (SP2) input voltage is below 0.1 V for 4.5 seconds or more (2 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2) • ECM
P077D	When the transmission revolution sensor (SP2) input voltage is higher than 1.9 V for 4.5 seconds or more (2 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2)

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DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
		• ECM

MONITOR DESCRIPTION

The transmission revolution sensor (SP2) detects the transmission output shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

If the ECM detects no signal from the transmission revolution sensor (SP2) even while the vehicle is moving, it will conclude that there is a malfunction in the transmission revolution sensor (SP2). The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0722: Transmission revolution sensor (SP2)/Verify pulse input P077C: Transmission revolution sensor (SP2)/Range check (Low voltage) P077D: Transmission revolution sensor (SP2)/Range check (High voltage)
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P0722: 5 sec. P077C, P077D: 4.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

P0722:

Vehicle speed	8.99 km/h (5.59 mph) or more
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
Park/neutral position switch (NSW)	OFF
Engine	Running
Transmission range switch circuit fail (P0705)	Not detected

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Output speed sensor range check fail (P077C, P077D)	Not detected
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more
2. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more

P077C and P077D:

Output speed sensor pulse input fail (P0722)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0722:

Output speed sensor signal	No signal

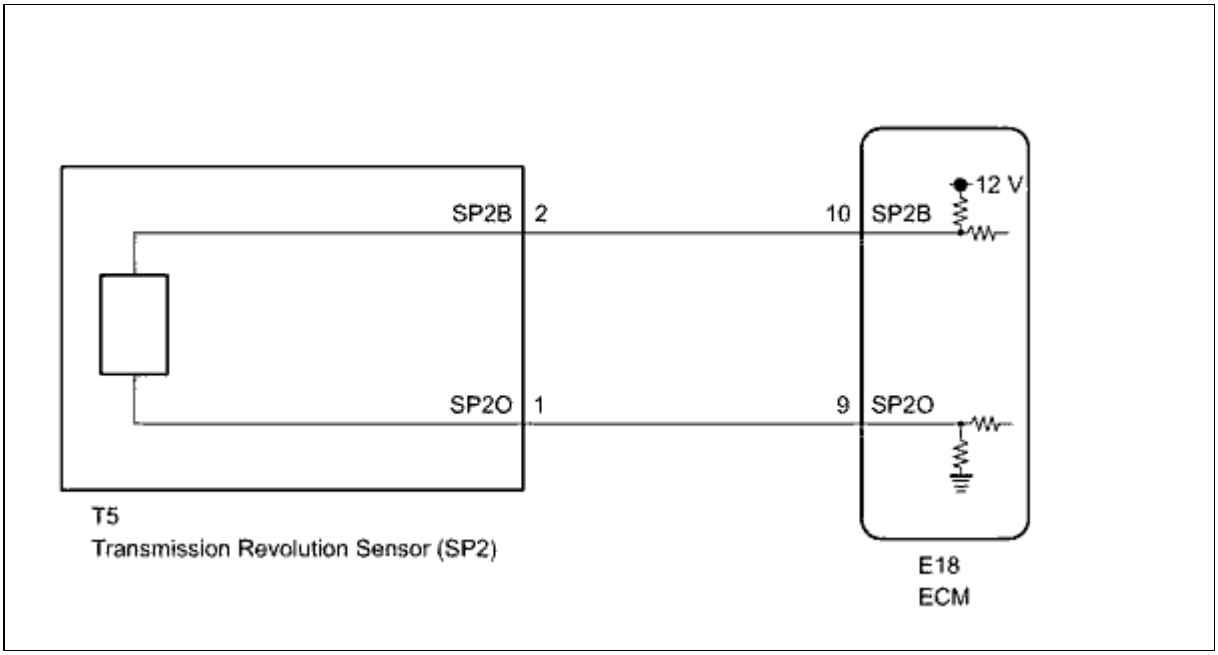
P077C:

Output speed	Below 0.1 V

P077D:

Output speed	Higher than 1.9 V

WIRING DIAGRAM



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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-

HINT:

- SPD (SP2) is always 0 while driving: Open or short in the sensor or circuit.
- SPD (SP2) value displayed on the Techstream is much lower than the actual vehicle speed: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPD (SP2) AND SP2 SENSOR VOLTAGE)**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-
SP2 Sensor Voltage	Transmission revolution sensor (SP2) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

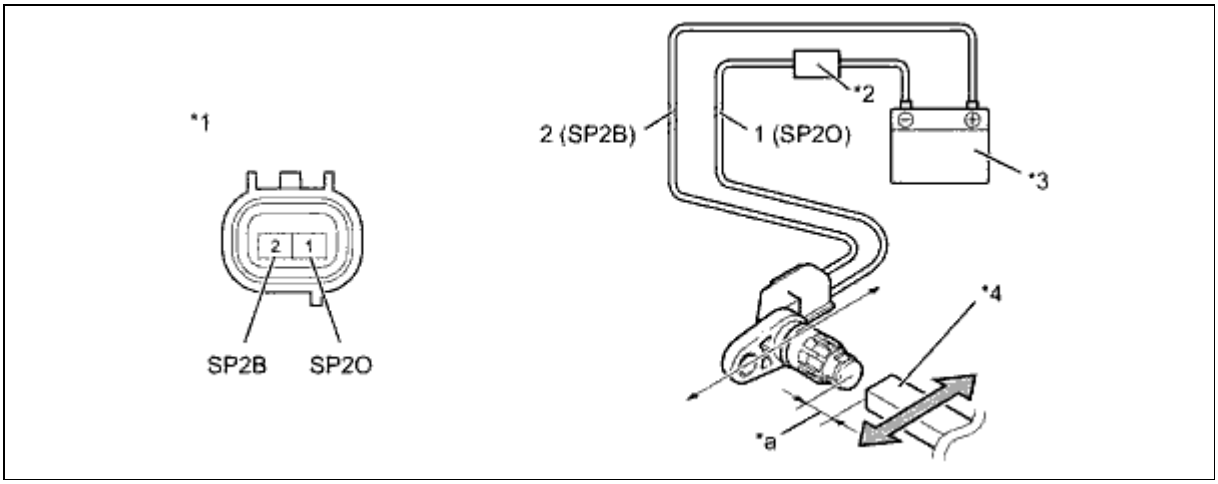
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (SP2)**

(a) Remove the transmission revolution sensor (SP2) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (SP2)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (SP2) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SP2O) - 2 (SP2B)	Low signal	4 to 8 mA
1 (SP2O) - 2 (SP2B)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (SP2)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (SP2) - ECM)**

(a) Disconnect the T5 transmission revolution sensor (SP2) connector.

(b) Disconnect the E18 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T5-2 (SP2B) - E18-10 (SP2B)	Always	Below 1 Ω
T5-1 (SP2O) - E18-9 (SP2O)	Always	Below 1 Ω
T5-2 (SP2B) - Body ground	Always	10 kΩ or higher
T5-1 (SP2O) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000027R705WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0741; Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL); 2016 MY Tacoma [08/2015 -]		

DTC	**P0741**	**Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL)**

SYSTEM DESCRIPTION

The ECM uses signals from the throttle position sensor, mass air flow meter, transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor to help determine the engagement timing of the lock-up clutch. The ECM monitors the engagement of the clutch using the transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SL, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0741	Lock-up does not occur when requested (2 trip detection logic).	• Shift solenoid valve SL remains closed • Transmission wire • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear etc.) • Line pressure is too low

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature, and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SL. When shift solenoid valve SL is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SL or lock-up system performance. The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)

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- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P0741: Shift solenoid valve SL OFF malfunction
Required sensors/Components	Shift solenoid valve SL, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE), Throttle position sensor (VPA1), Mass air flow meter (MAF), ATF temperature sensor (THO1), Engine coolant temperature sensor (ECT)
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction

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Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

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| Engine Speed - Turbine speed |	70 rpm or more

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more

HINT:

This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

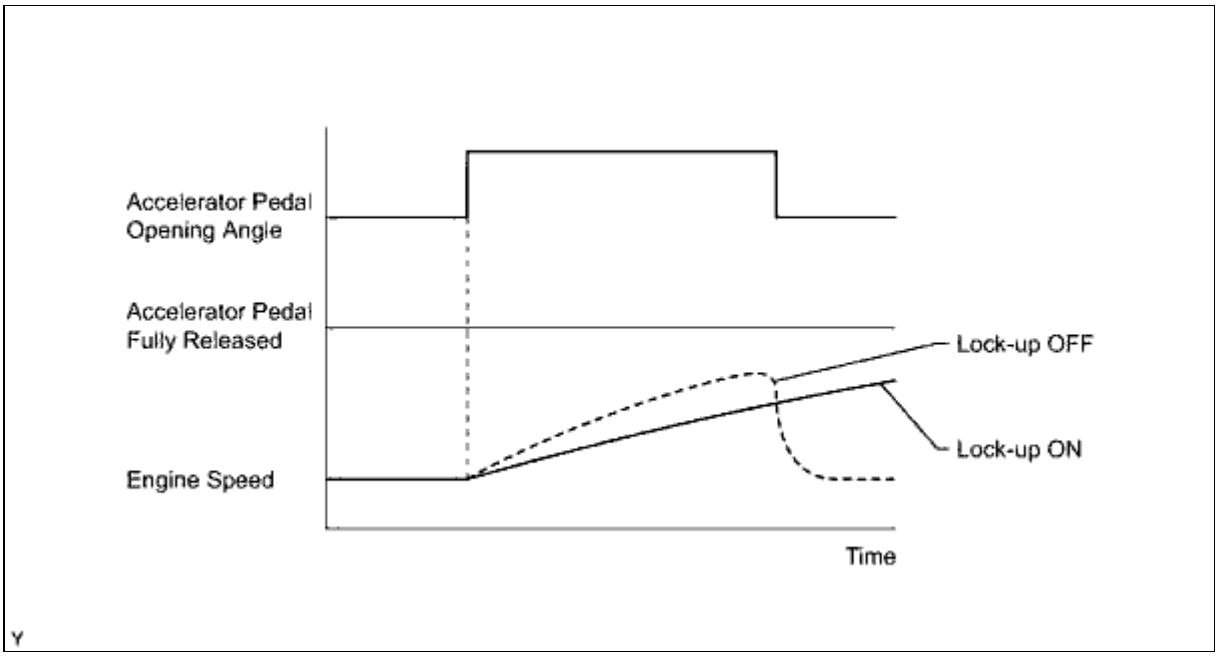
(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.

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- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)



PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0741)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0741 is output	A
P0741 and other DTCs are output	B

HINT:

If any other codes besides P0741 are output, perform the troubleshooting for those DTCs first.

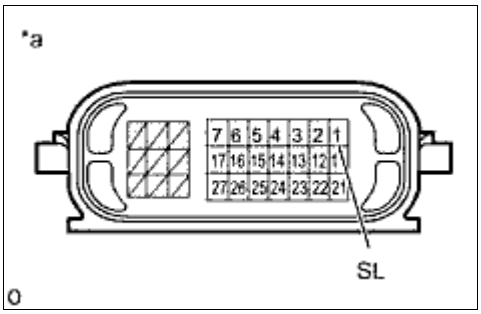
B ▶ **GO TO DTC CHART**

A ▼

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2.	INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

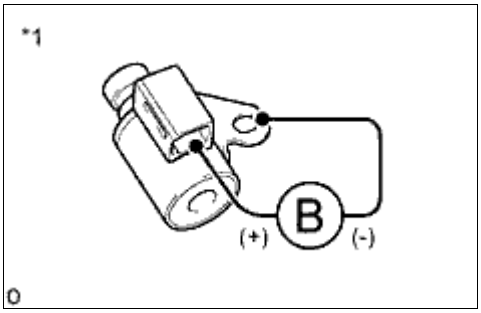
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 6**

OK ▼

3.	INSPECT SHIFT SOLENOID VALVE SL (OPERATION)

(a) Remove shift solenoid valve SL INFO .



(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

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MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

5.	**INSPECT TORQUE CONVERTER ASSEMBLY**

(a) Check the torque converter assembly INFO .

OK:

The torque converter operates normally.

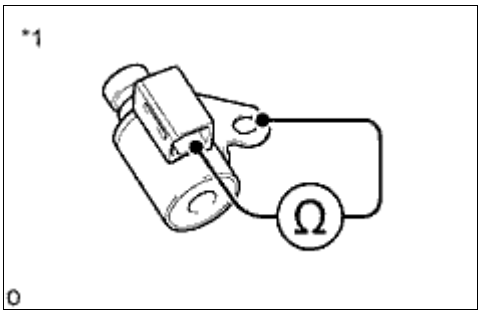
NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

6.	**INSPECT SHIFT SOLENOID VALVE SL (RESISTANCE)**

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(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VT08NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0746; Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1); 2016 MY Tacoma [08/2015 -]		

DTC	**P0746**	**Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0746	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 1st, 2nd, 3rd or 4th gear is commanded. • Either condition is met twice: ○ When a shift to 5th gear is commanded, 4th gear is engaged. ○ When a shift to 6th gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL1 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0746: Shift solenoid valve SL1 OFF malfunction Shift solenoid valve SL1 ON malfunction
Required sensors/Components	Shift solenoid valve SL1, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles

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Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

OFF malfunction:

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ECM selected gear	1st, 2nd, 3rd or 4th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction:

ECM selected gear	5th or 6th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

[ON malfunction]

2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0746)**

(a) Connect the Techstream to the DLC3.

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(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0746 is output	A
P0746 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the	Operates the shift	• Press "→"	Can be used to check the operation of

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Shift Position	solenoid valves to allow gears to be selected manually.	button: Up-shift occurs • Press "←" button: Down-shift occurs	the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

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C ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)

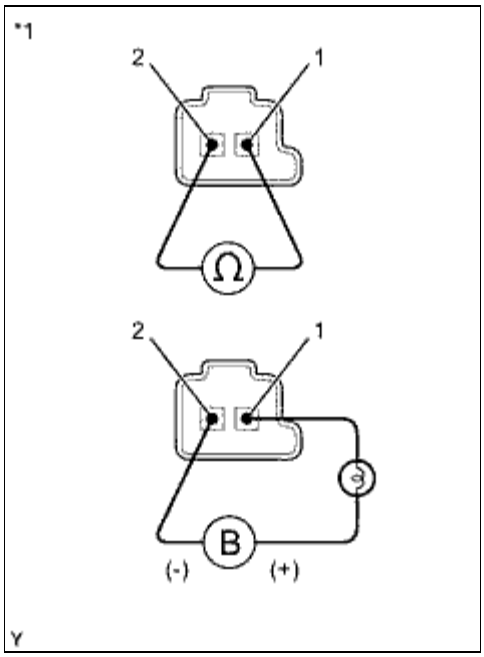
D ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)

E ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)

A ▼

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION

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MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL1

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL1**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8F0LKX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0748; Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1); 2016 MY Tacoma [08/2015 -]		

DTC	**P0748**	**Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0748	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL1 circuit while driving and shifting gears (SL1 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL1 circuit • Shift solenoid valve SL1 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL1 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL1 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0748: Shift solenoid valve SL1/Range check
Required sensors/Components	Shift solenoid valve SL1
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

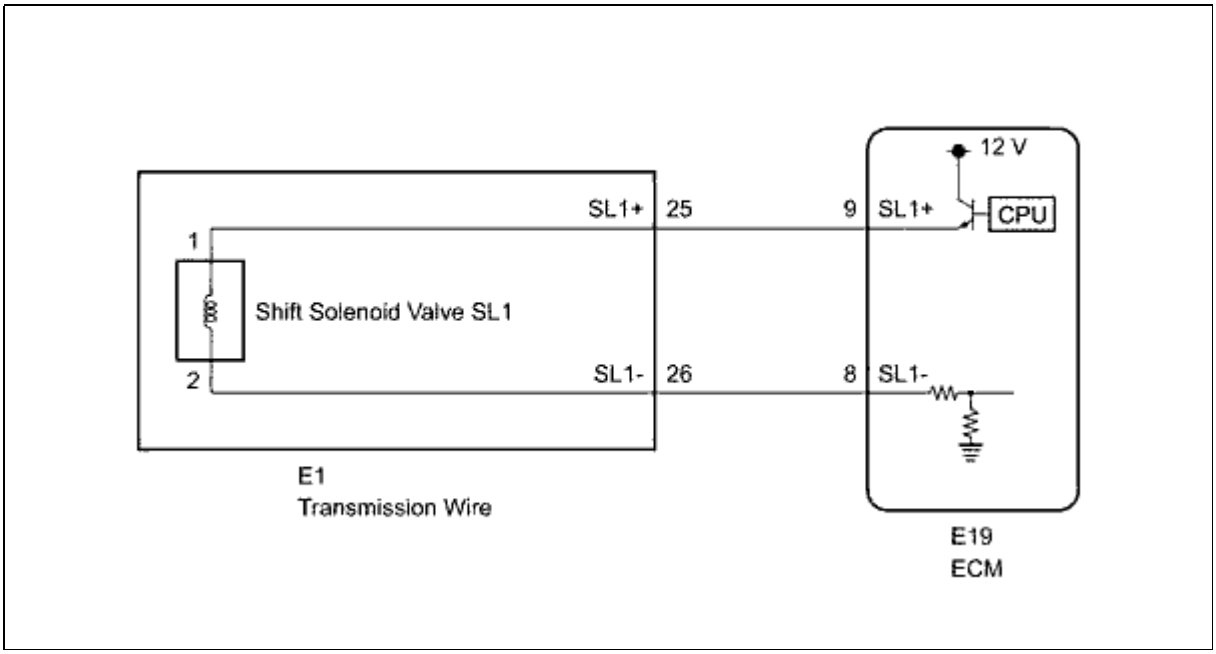
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL1 when the shift lever is in D:

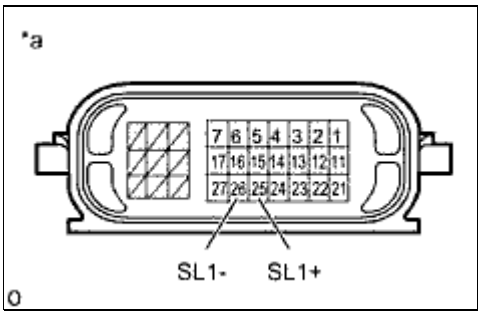
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL1)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
25 (SL1+) - 26 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
25 (SL1+) - Body ground	Always	10 kΩ or higher
26 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

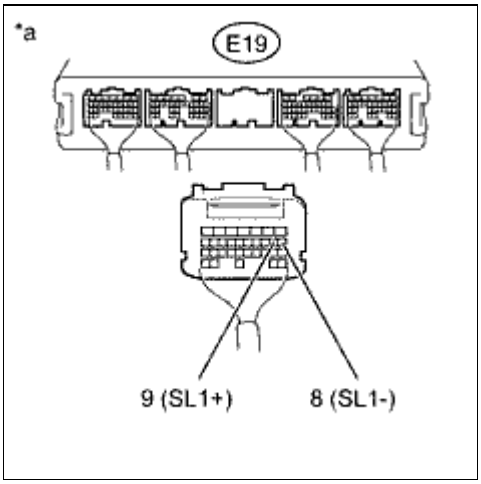
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-9 (SL1+) - E19-8 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
E19-9 (SL1+) - Body ground	Always	10 kΩ or higher
E19-8 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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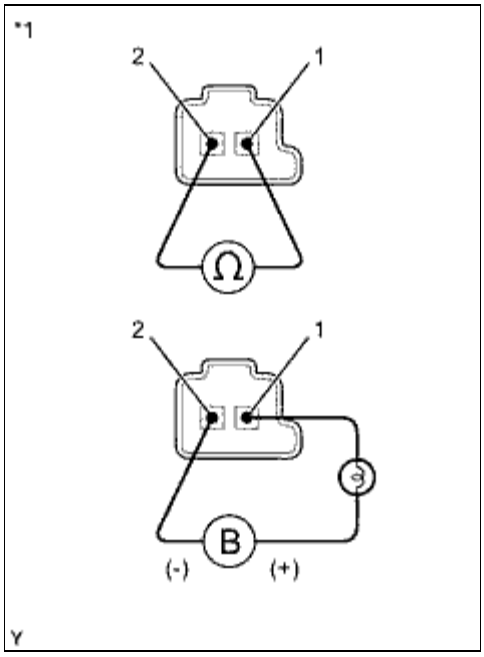
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL1

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL1

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VU08XX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0776; Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2); 2016 MY Tacoma [08/2015 -]		

DTC	**P0776**	**Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0776	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 4th, 5th or 6th gear is commanded. • One of the following conditions is met twice: ○ When a shift to 1st gear is commanded, 4th gear is engaged. ○ When a shift to 2nd gear is commanded, 4th gear is engaged. ○ When a shift to 3rd gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL2 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0776: Shift solenoid valve SL2/OFF malfunction Shift solenoid valve SL2/ON malfunction
Required sensors/Components	Shift solenoid valve SL2, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.

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MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

OFF malfunction:

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ECM selected gear	4th, 5th or 6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction (A):

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (B):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (C):

ECM selected gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

[ON malfunction]

One of the following conditions is met: ON malfunction (A), (B) or (C)
2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction (A), (B) or (C):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

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NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0776)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0776 is output	A
P0776 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

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(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D

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ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO STEP 3**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)**

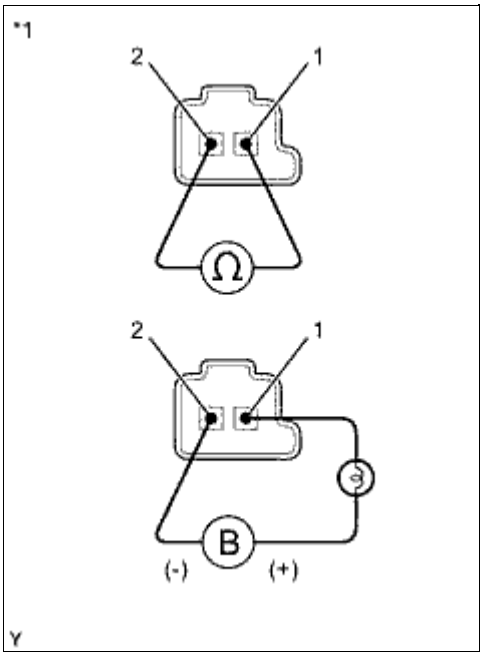
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

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(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL2**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8G0KBX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0778; Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2); 2016 MY Tacoma [08/2015 -]		

DTC	**P0778**	**Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0778	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL2 circuit while driving and shifting gears (SL2 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL2 circuit • Shift solenoid valve SL2 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL2 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL2 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0778: Shift solenoid valve SL2/Range check
Required sensors/Components	Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

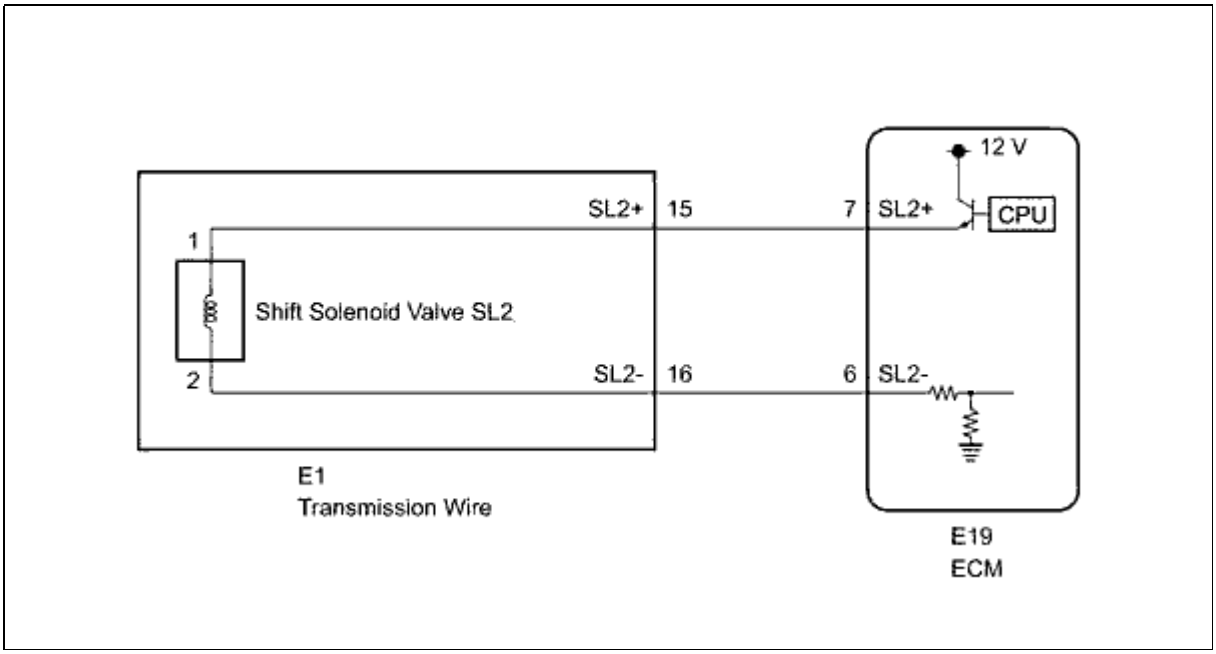
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL2 when the shift lever is in D:

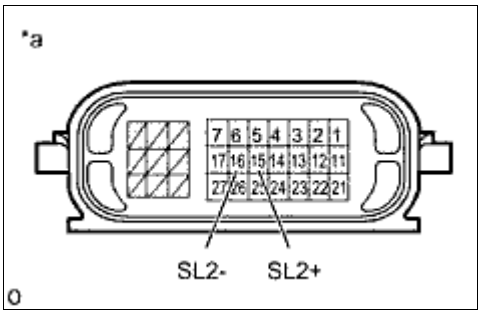
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test.
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL2)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
15 (SL2+) - 16 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
15 (SL2+) - Body ground	Always	10 kΩ or higher
16 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

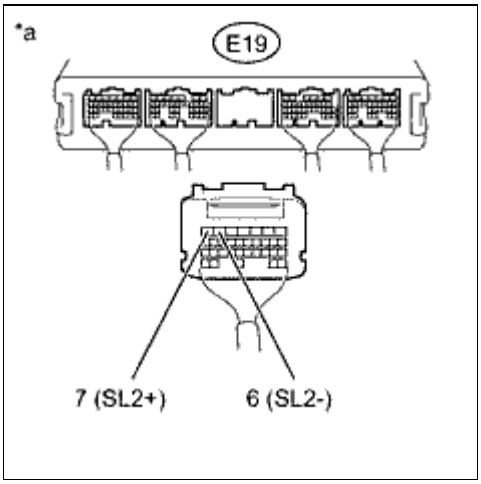
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-7 (SL2+) - E19-6 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
E19-7 (SL2+) - Body ground	Always	10 kΩ or higher
E19-6 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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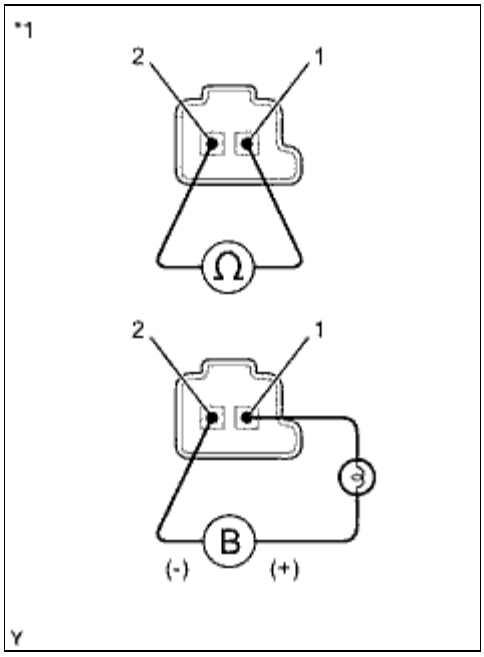
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL2

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VV08VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0796; Pressure Control Solenoid "C" Performance (Shift Solenoid Valve SL3); 2016 MY Tacoma [08/2015 -]		

DTC	**P0796**	**Pressure Control Solenoid "C" Performance (Shift Solenoid Valve SL3)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0796	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 2nd or 6th gear is commanded. • The following condition is met twice: When a shift to 1st gear is commanded, 2nd gear is engaged.	• Shift solenoid valve SL3 remains open or closed. • Transmission valve body assembly is blocked. • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0796: Shift solenoid valve SL3/OFF malfunction Shift solenoid valve SL3/ON malfunction
Required sensors/Components	Shift solenoid valve SL3, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C) and (D): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

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TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

OFF malfunction (A):

ECM selected gear	2nd
Throttle valve opening angle	3% or more

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ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (B):

ECM selected gear	6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (C):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle: (When condition "D" is not detected)	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
Throttle valve opening angle: (When condition "D" is detected)	0% or more at output speed 900 rpm (Condition varies with output speed)
ECT (engine coolant temperature)	40°C (104°F) or higher

OFF malfunction (D):

Throttle valve opening angle	0% or more at output speed 900 rpm (Condition varies with output speed)

ON malfunction:

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or ((C) and (D))

OFF malfunction (A):

Turbine speed - Output speed x 2nd gear ratio	1000 rpm or more

OFF malfunction (B):

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Turbine speed - Output speed x 6th gear ratio	1000 rpm or more

OFF malfunction (C) and (D):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.724

[ON malfunction]

2 detections are necessary per driving cycle:

1st detection: temporary flag ON

2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	1.95 to 2.4

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0796)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0796 is output	A
P0796 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

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A ▶ GO TO STEP 3

B ▼

2.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.

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- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

C ▶ **GO TO STEP 3**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)**

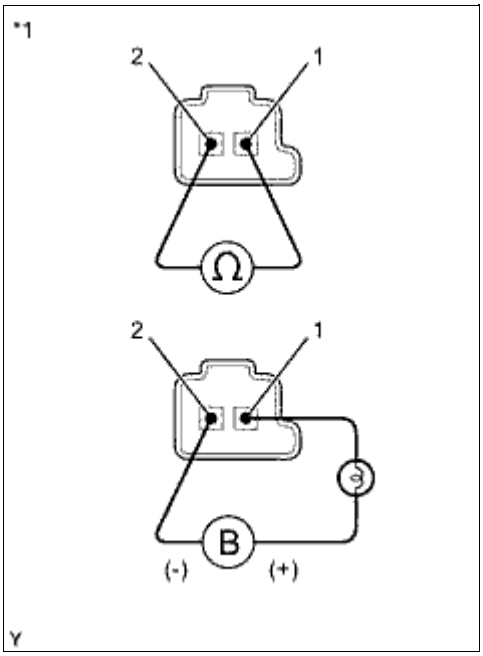
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)**

3.	**INSPECT SHIFT SOLENOID VALVE SL3**

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(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL3**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015W808NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0798; Pressure Control Solenoid "C" Electrical (Shift Solenoid Valve SL3); 2016 MY Tacoma [08/2015 -]		

DTC	**P0798**	**Pressure Control Solenoid "C" Electrical (Shift Solenoid Valve SL3)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0798	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL3 circuit while driving and shifting gears (SL3 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL3 circuit • Shift solenoid valve SL3 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL3 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL3 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0798: Shift solenoid valve SL3/Range check
Required sensors/Components	Shift solenoid valve SL3
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

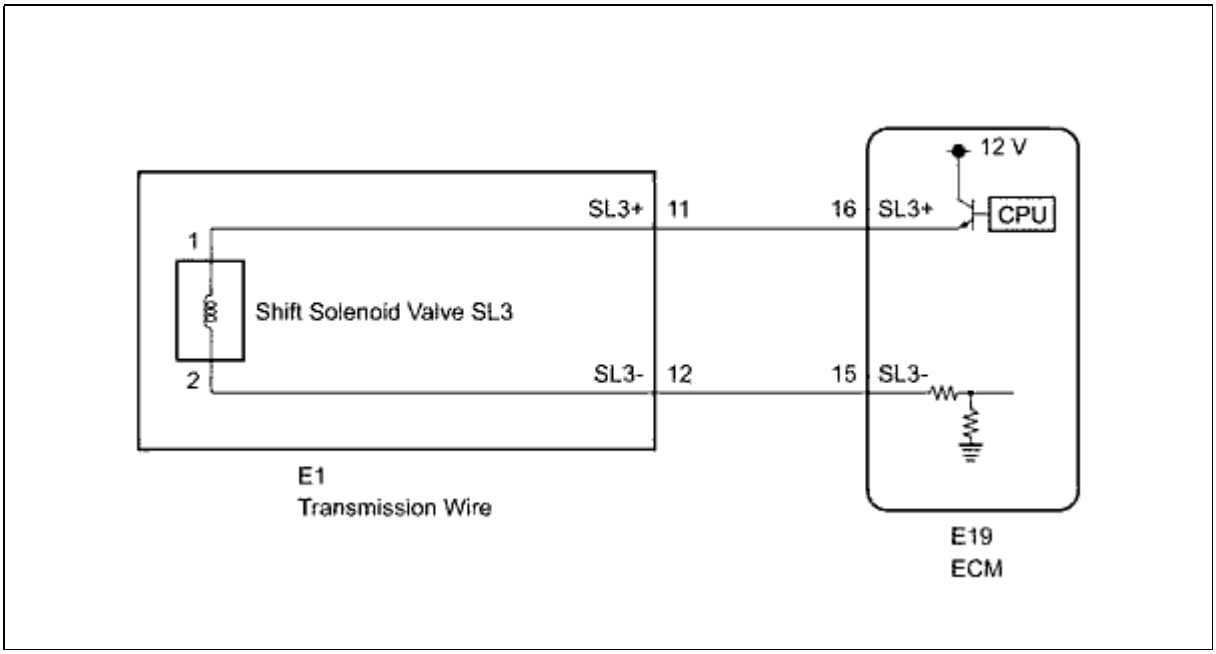
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL3 when the shift lever is in D:

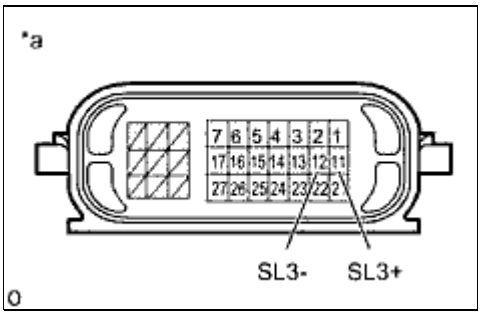
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL3)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
11 (SL3+) - 12 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
11 (SL3+) - Body ground	Always	10 kΩ or higher
12 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

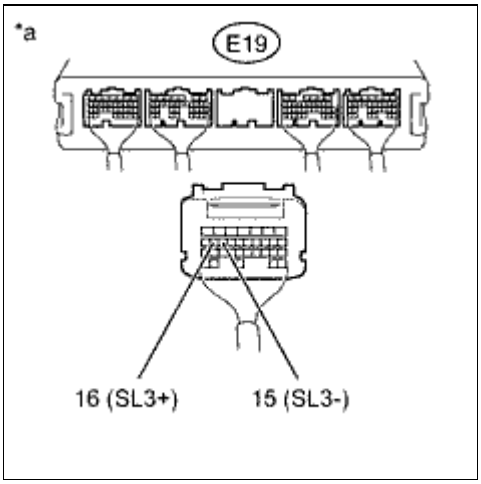
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-16 (SL3+) - E19-15 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
E19-16 (SL3+) - Body ground	Always	10 kΩ or higher
E19-15 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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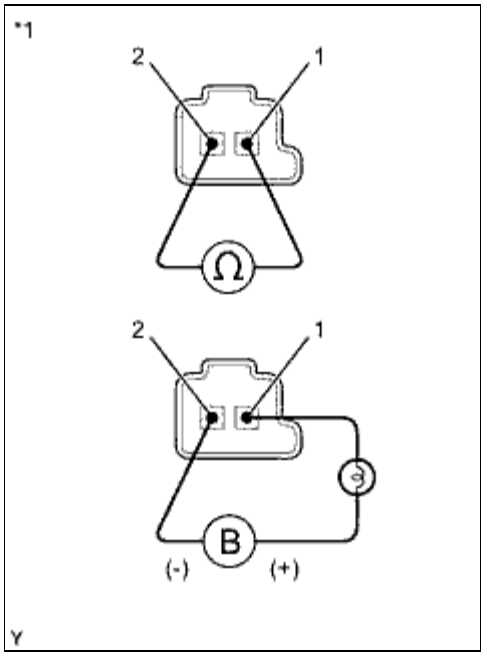
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL3**

(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL3

OK ▶ REPLACE TRANSMISSION WIRE

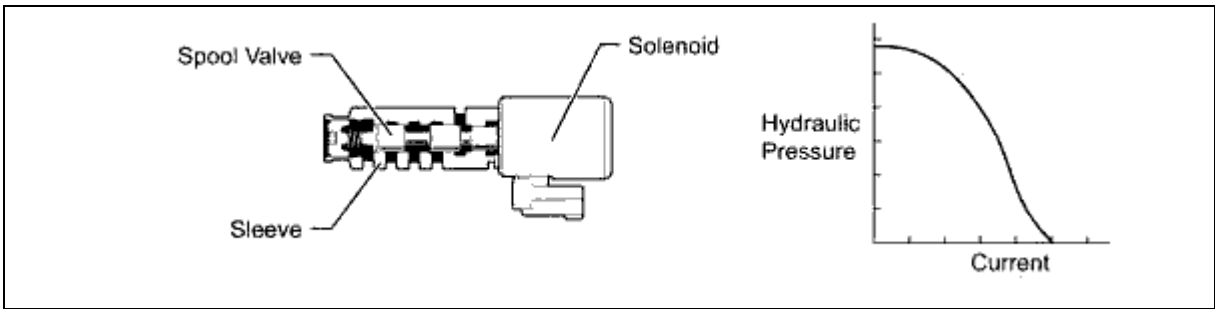
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W830Q4X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2714; Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT); 2016 MY Tacoma [08/2015 -]		

DTC	**P2714**	**Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)**

SYSTEM DESCRIPTION

The shift solenoid valve SLT controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the current to shift solenoid valve SLT to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2714	The ECM detects a malfunction in the shift solenoid valve SLT (ON side) according to the difference in the speed between the turbine and the output shaft, and also by the ATF pressure. (2 trip detection logic)	• Shift solenoid valve SLT remains open • Shift solenoid valve SL1, SL2, SL3 or SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

The ECM calculates the amount of clutch slip based on the input turbine speed, output shaft speed, and gear ratio. If the amount of clutch slip exceeds a specified level, the ECM will set this DTC and illuminate the MIL.

When shift solenoid valve SLT remains on, the line pressure goes down and clutch engagement force decreases.

NOTICE:

If the vehicle continues to be driven under these conditions, the clutch will burn up and the vehicle will no longer be drivable.

MONITOR STRATEGY

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Related DTCs	P2714: Shift solenoid valve SLT/ON malfunction
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	ON malfunction: 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ON malfunction:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2716 (Shift solenoid valve SLT circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLT circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: ON malfunction (A), (B), (C), (D), (E), (F) or (G)

ON malfunction (A):

Summation of clutch heat generations	Specified value

ON malfunction (B):

Shift solenoid valve SL1 ON malfunction	Detected

ON malfunction (C):

Shift solenoid valve SL1 OFF malfunction	Detected

ON malfunction (D):

Shift solenoid valve SL2 OFF malfunction	Detected

ON malfunction (E):

Shift solenoid valve SL3 OFF malfunction	Detected

ON malfunction (F):

Shift solenoid valve SL4 ON malfunction	Detected

ON malfunction (G):

Shift solenoid valve SL4 OFF malfunction	Detected

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.

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4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P2714)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P2714 is output	A
P2714 and other DTCs are output	B

HINT:

If a solenoid is stuck on, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 4**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE SOLENOID (SLT))**

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.
- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.

HINT:

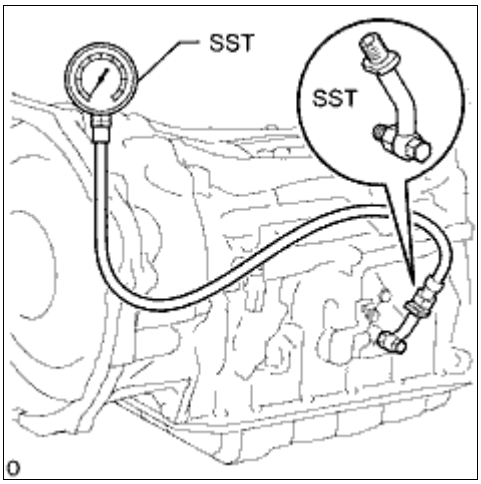
Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Turn the ignition switch off.

(b) Lift the vehicle up.

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(c) Remove the test plug from the transmission case and connect SST.



SST: 09993-19015

09993-00010

09993-00040

(d) Lower the vehicle.

(e) Fully apply the parking brake and chock the 4 wheels.

(f) Connect the Techstream to the DLC3.

(g) Start the engine.

(h) Warm up the ATF (Automatic Transmission Fluid).

(i) Measure the line pressure when the engine is idling.

(j) Turn the Techstream on.

(k) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(l) Follow the instructions on the Techstream and perform the Active Test.

(m) Measure the line pressure with SST.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Solenoid (SLT)*	Operates shift solenoid valve SLT to raise the line pressure.	ON/OFF **HINT:** ON: No action (normal operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid (SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	[Vehicle Condition] • Vehicle Stopped • Engine idling

*: The "Activate the solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

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Note that the pressure readings for the Active Test and Hydraulic Test are different.

OK:

The line pressure changes as specified when performing the Active Test.

NG ▶ **GO TO STEP 4**

OK ▼

3.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

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- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)**

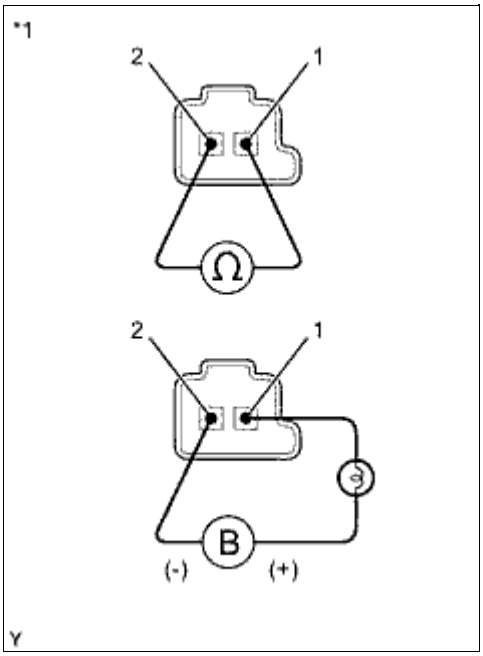
E ▶ **GO TO STEP 4**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)**

4.	**INSPECT SHIFT SOLENOID VALVE SLT**

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(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLT

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLT**

OK ▼

5.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8A0OUX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2716; Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT); 2016 MY Tacoma [08/2015 -]		

DTC	**P2716**	**Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)**

DESCRIPTION

Refer to the system description for DTC P2714 INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2716	Open or short is detected in shift solenoid valve SLT circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM

MONITOR DESCRIPTION

When an open or short in the shift solenoid valve SLT circuit is detected, the ECM interprets this as a fault. The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2716: Shift solenoid valve SLT/Range check
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

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Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

Condition (D):

Battery voltage	11 V or higher
Target current	1 A or higher

Condition (E):

Battery voltage	11 V or higher
Target current	0.1 A or more
| Target voltage - Last Target voltage |	Less than 0.000019 V

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B), (C) or (D)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

Output duty cycle	0% or less

Condition (D):

Solenoid voltage monitor	No signal

Condition (E):

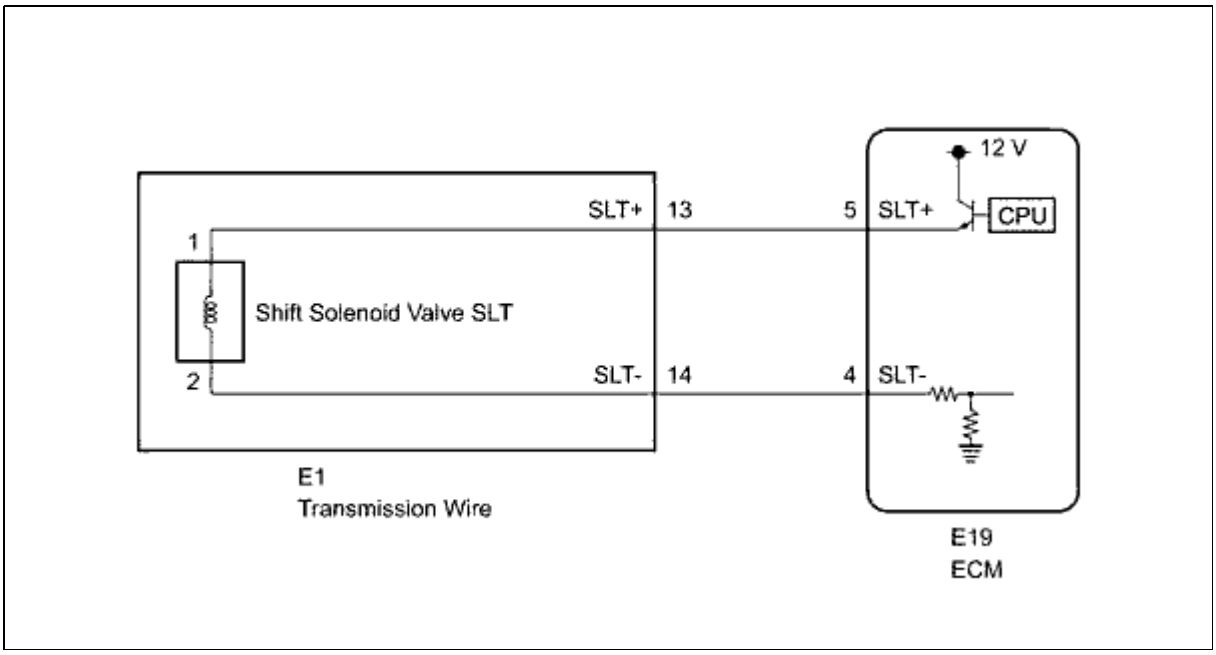
| Target voltage - Average of monitor voltage |	0.035 V or more

COMPONENT OPERATING RANGE

Output duty cycle	More than 3%, and less than 100%
Solenoid voltage monitor	Signal input
| Target voltage - Average of monitor voltage |	Less than 0.035 V

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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

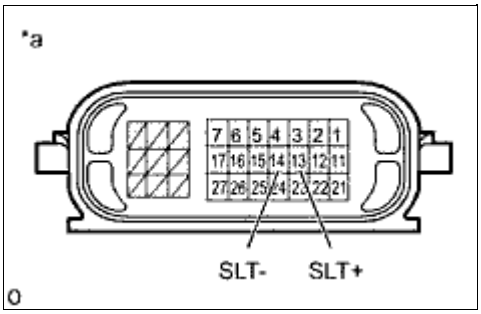
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLT)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
13 (SLT+) - 14 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
13 (SLT+) - Body ground	Always	10 kΩ or higher
14 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

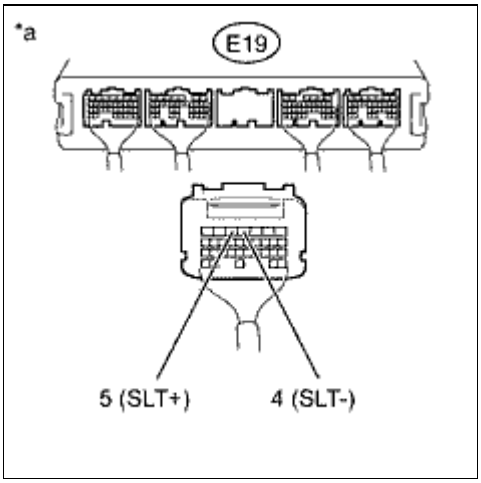
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-5 (SLT+) - E19-4 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
E19-5 (SLT+) - Body ground	Always	10 kΩ or higher
E19-4 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

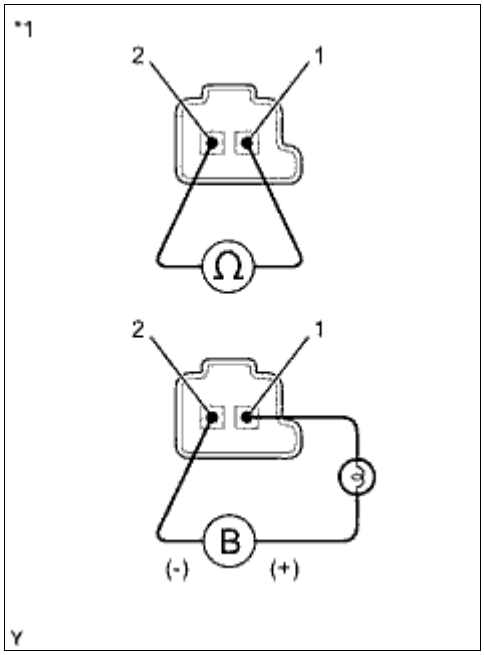
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NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE ECM

3.	**INSPECT SHIFT SOLENOID VALVE SLT**

(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLT

NG ▶ REPLACE SHIFT SOLENOID VALVE SLT

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OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000012XR0AWX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2742,P2743; Transmission Fluid Temperature Sensor "B" Circuit Low Input; 2016 MY Tacoma [08/2015 -]		

DTC	**P2742**	**Transmission Fluid Temperature Sensor "B" Circuit Low Input**

DTC	**P2743**	**Transmission Fluid Temperature Sensor "B" Circuit High Input**

DESCRIPTION

The No. 2 ATF temperature sensor is installed in the transmission valve body assembly.

If the ECM detects an abnormally high ATF temperature near this sensor, it illuminates the warning indicator.

HINT:

- The temperature of ATF easily rises when towing, climbing hills, in traffic, etc.
- If the No. 2 ATF temperature sensor becomes short-circuited, the signal that indicates that the ATF temperature is 150°C (302°F) or higher is input into the ECM.

Vehicle conditions when the sensor is normal and when the sensor is short-circuited are indicated in the table below.

NO. 2 ATF TEMPERATURE SENSOR STATE	DETECTION CONDITION	SYMPTOM	RECOVERY CONDITION
Sensor is normal	ATF temperature higher than 150°C (302°F)	ATF temperature warning indicator remains on	ATF temperature below 135°C (275°F)*1
	ATF temperature higher than 130°C (266°F)	Shift point too high	ATF temperature below 110°C (230°F)
Sensor is short-circuited	Any conditions	Shift point too high	Symptoms still occur
	Engine coolant temperature higher than 95°C (203°F)	Lock-up at 3rd gear*2	Symptoms still occur

HINT:

*1: When ATF temperature is in the normal range, it decreases to below 135°C (275°F) within 5 minutes with the shift lever in P or N in an idling state.

*2: When ATF temperature is normal, transmission lock-up occurs in 4th, 5th and 6th gear with the shift lever in D or with the S6 range selected, in 4th or 5th gear with the S5 range selected, and 4th gear with the S4 range selected.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
P2742	No. 2 ATF temperature sensor resistance is below 25 Ω for 0.5 seconds or more (1 trip detection logic).	• Short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature

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DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
		sensor (transmission wire) • ECM
P2743	No. 2 ATF temperature sensor resistance is higher than 156 kΩ for 0.5 seconds or more and either condition is met (1 trip detection logic): (A) 15 minutes or more have elapsed after the engine start when the engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 seconds or more have elapsed after the engine start when the engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor (transmission wire) • ECM

MONITOR DESCRIPTION

The No. 2 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 2 ATF temperature sensor circuit. If the resistance value of the No. 2 ATF temperature sensor is below 25 Ω*1 or higher than 156 kΩ*2, the ECM interprets this as a fault in the No. 2 ATF temperature sensor or wiring. The ECM stores the DTC.

*1: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

*2: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

WIRING DIAGRAM

Refer to DTC P0712 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 15 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

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NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.

HINT:

- When DTC P2742 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.
- When DTC P2743 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

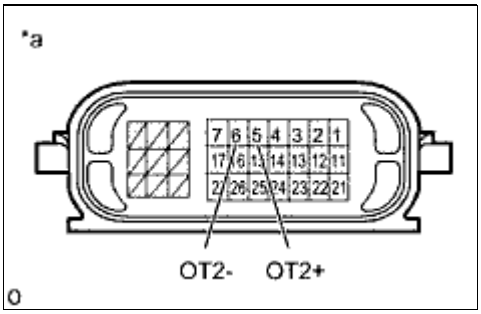
Check the temperature displayed on the Techstream in order to check if a malfunction exists.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

PROCEDURE

1.	**INSPECT NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
5 (OT2+) - Body ground	Always	10 kΩ or higher
6 (OT2-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

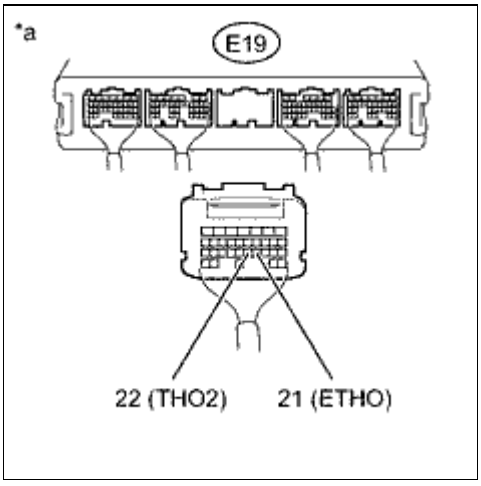
*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-22 (THO2) - E19-21 (ETHO)	Always	25 Ω to 156 kΩ
E19-22 (THO2) - Body ground	Always	10 kΩ or higher
E19-21 (ETHO) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

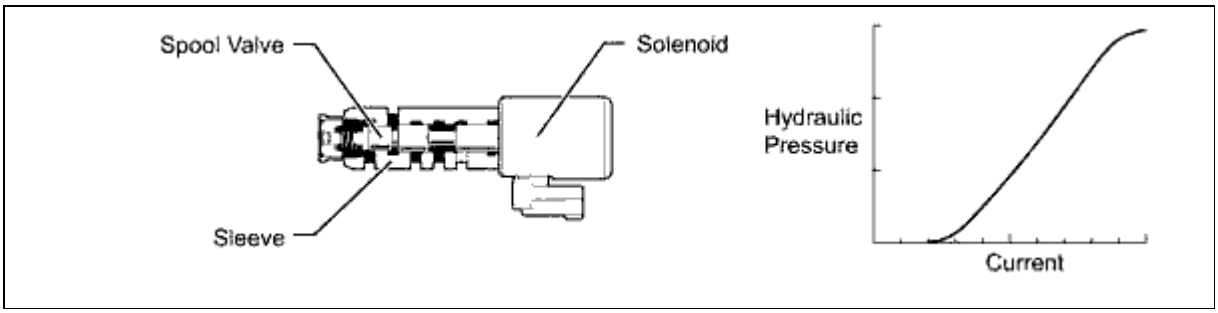
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8D0KNX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2757; Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU); 2016 MY Tacoma [08/2015 -]		

DTC	**P2757**	**Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU)**

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, mass air flow meter, input turbine speed sensor, output shaft speed sensor and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.



The ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SLU, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2757	Both conditions are met (2 trip detection logic): • Lock-up does not occur when requested. • Lock-up occurs when shift solenoid valve SLU is requested to turn on in the lock-up range.	• Shift solenoid valve SLU remains open or closed • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear, etc.) • Line pressure is too low

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SLU. When shift solenoid valve SLU is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

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If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SLU or lock-up system performance.

The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)
- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P2757: Shift solenoid valve SLU OFF malfunction Shift solenoid valve SLU ON malfunction
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec. ON malfunction: 1.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system))

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	U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376

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Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

ON malfunction:

ECM lock-up command	OFF (SLU pressure: Below 4 kPa (0.04 kgf/cm ^{2} , 0.6 psi))
Duration time from SLU command	3 sec. or more
Duration time from SL command ON	0.064 sec. or more
Shift solenoid valve SL	Not OFF malfunction
Throttle valve opening angle	8.5% or more at turbine speed of 3000 rpm (Condition varies with turbine speed)
Vehicle speed when ECM selected 2nd, 3rd or 4th gear	Less than 35 km/h (21.8 mph)
Vehicle speed when ECM selected 5th gear	Less than 50 km/h (31.1 mph)
Vehicle speed when ECM selected 6th gear	Less than 60 km/h (37.3 mph)

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

| Engine speed - Turbine speed |	70 rpm or more

ON malfunction:

| Engine speed - Turbine speed |	Less than 35 rpm

COMPONENT OPERATING RANGE

Transmission revolution sensor (NT)	Input speed is equal to engine speed when lock-up is ON.

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.

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3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more

HINT:

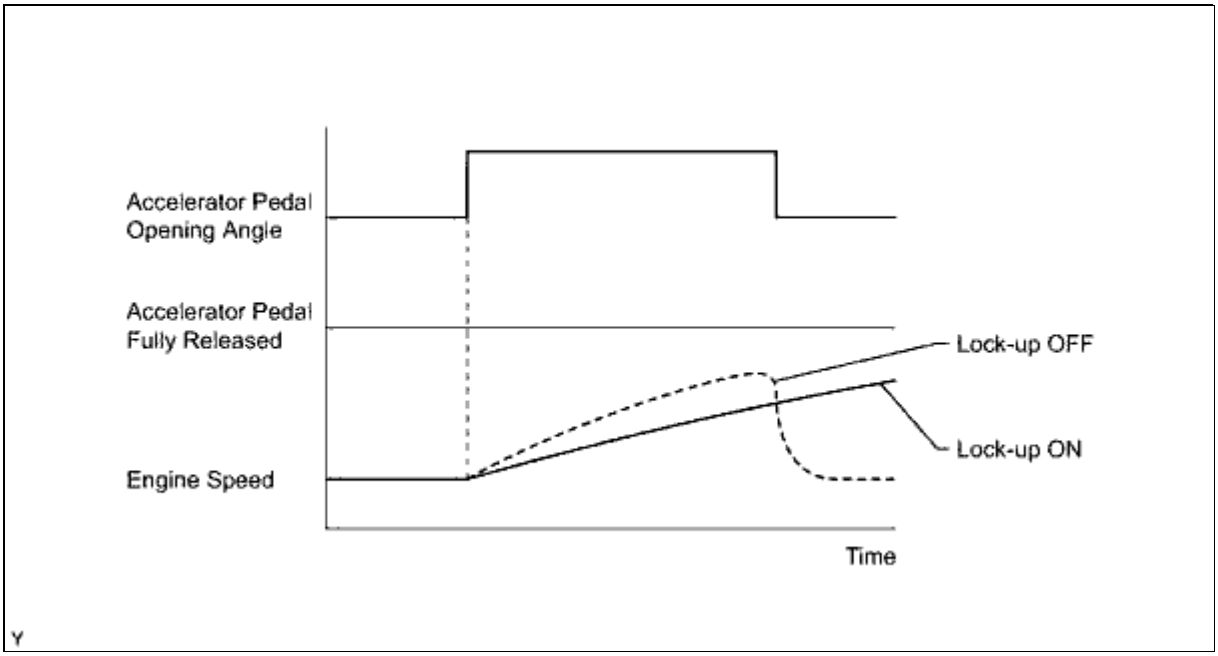
This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)

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PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P2757)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P2757 is output	A
P2757 and other DTCs are output	B

HINT:

If any DTCs other than P2757 are output, perform troubleshooting for those DTCs first.

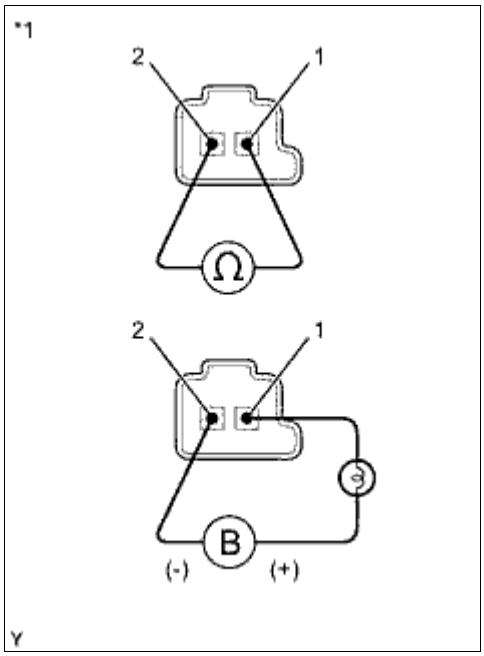
B ▶ **GO TO DTC CHART**

A ▼

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2.	**INSPECT SHIFT SOLENOID VALVE SLU**

(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▼

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3.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

4.	**INSPECT TORQUE CONVERTER ASSEMBLY**

(a) Check the torque converter assembly INFO .

OK:

The torque converter assembly operates normally.

NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W890MCX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2759; Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU); 2016 MY Tacoma [08/2015 -]		

DTC	**P2759**	**Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU)**

DESCRIPTION

Refer to the system description for DTC P2757 INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2759	Open or short is detected in shift solenoid valve SLU circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLU circuit • Shift solenoid valve SLU • ECM

MONITOR DESCRIPTION

When an open or short in a shift solenoid valve SLU circuit is detected, the ECM determines there is a malfunction. The ECM will illuminate the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P2759: Shift solenoid valve SLU/Range check
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Ignition switch	ON
Starter	OFF

Condition (A):

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Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

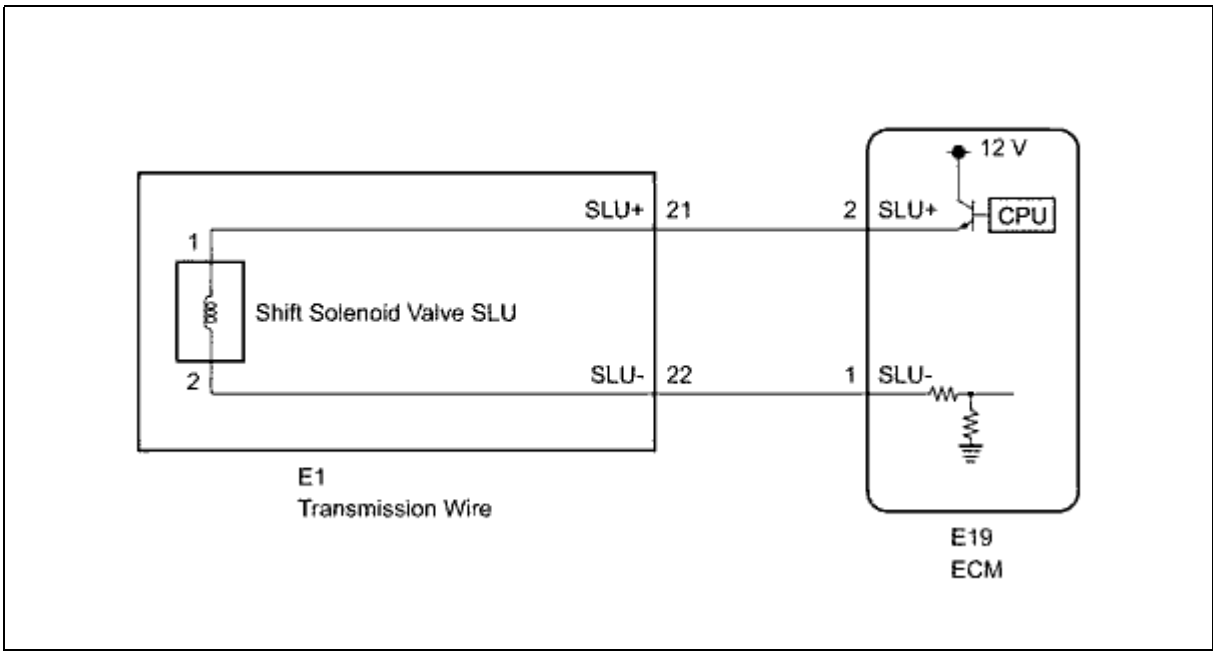
Condition (C):

Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM



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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

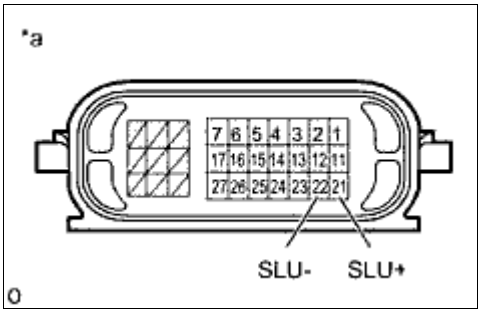
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLU)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
21 (SLU+) - 22 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
21 (SLU+) - Body ground	Always	10 kΩ or higher
22 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Transmission Wire)

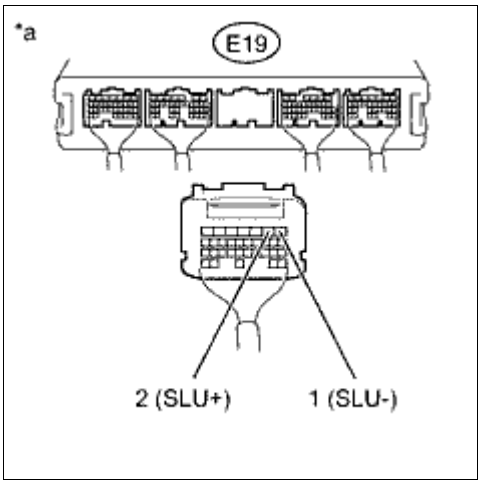
NG ▶ **GO TO STEP 3**

OK ▼

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2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-2 (SLU+) - E19-1 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
E19-2 (SLU+) - Body ground	Always	10 kΩ or higher
E19-1 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

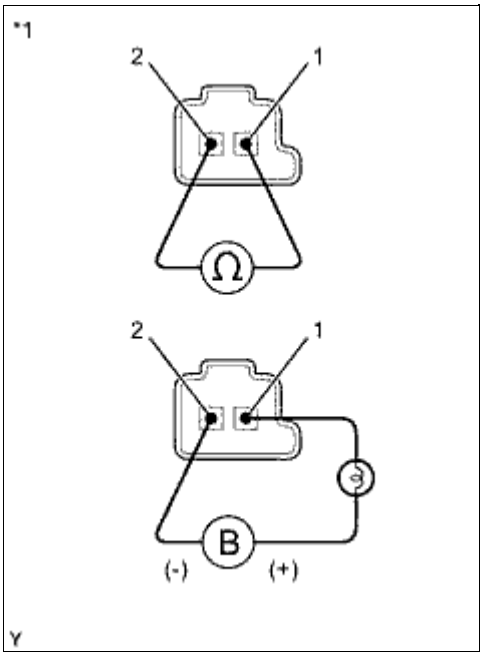
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SLU**

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(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001IYS060X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2769,P2770; Short in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL); 2016 MY Tacoma [08/2015 -]		

DTC	**P2769**	**Short in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)**

DTC	**P2770**	**Open in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)**

DESCRIPTION

Shift solenoid valve SL is turned on and off by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2769	ECM detects a short in the shift solenoid valve SL circuit when the shift solenoid valve SL is operated (2 trip detection logic).	• Short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM
P2770	ECM detects an open in the shift solenoid valve SL circuit when the shift solenoid valve SL is not operated (2 trip detection logic).	• Open in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM

Fail-safe function:

If the ECM detects a malfunction, it turns shift solenoid valve SL off.

MONITOR DESCRIPTION

Based on the signals from the throttle position sensor, the air flow meter and the crankshaft position sensor, the ECM sends a signal to shift solenoid valve SL to regulate the hydraulic pressure and provide smoother torque converter engagement. Shift solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform the torque-converter lock-up function. If the ECM detects an open or short in the shift solenoid valve SL circuit, it will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2769: Shift solenoid valve SL/Range check P2770: Shift solenoid valve SL/Range check
Required sensors/Components	Shift solenoid valve SL
Frequency of operation	Continuous
Duration	1 time

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MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
Command to shift solenoid valve SL	ON

P2769:

Time after command to solenoid OFF to ON	0.008 sec. or more

P2770:

Time after command to solenoid ON to OFF	0.008 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

P2769:

Solenoid terminal voltage level	Low

P2770:

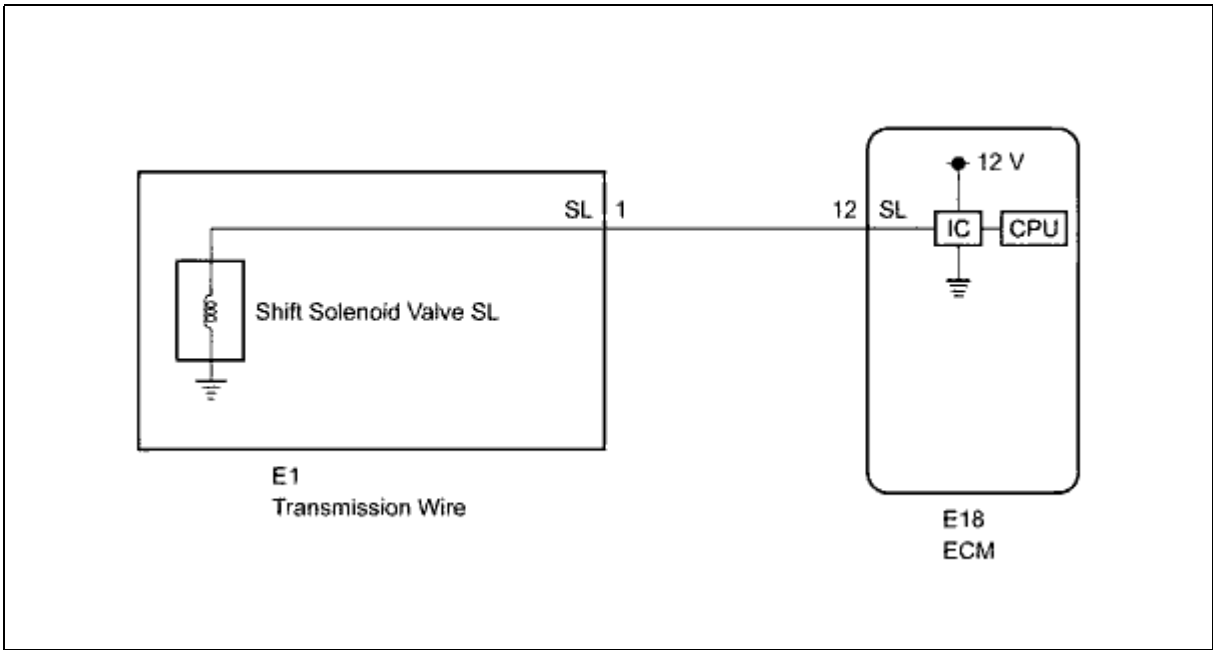
Solenoid terminal voltage level	High

COMPONENT OPERATING RANGE

Solenoid terminal voltage level (Command to solenoid ON)	High
Solenoid terminal voltage level (Command to solenoid OFF)	Low

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

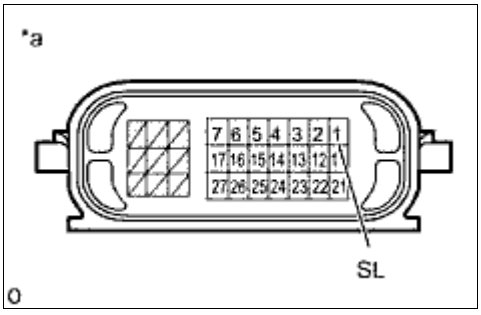
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

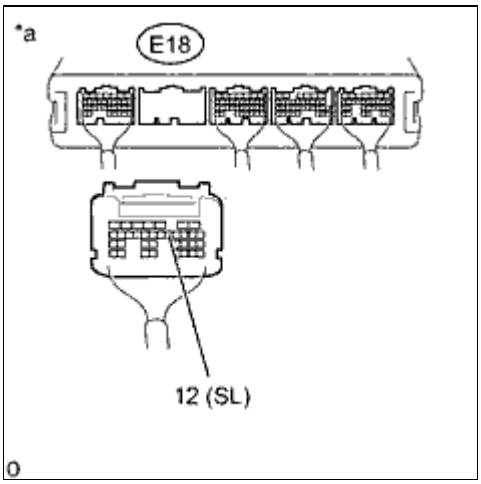
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E18-12 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

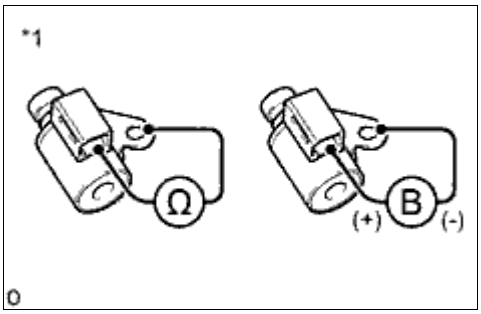
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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3.	INSPECT SHIFT SOLENOID VALVE SL

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VQ05WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2808; Pressure Control Solenoid "G" Performance (Shift Solenoid Valve SL4); 2016 MY Tacoma [08/2015 -]		

DTC	**P2808**	**Pressure Control Solenoid "G" Performance (Shift Solenoid Valve SL4)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2808	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 3rd or 5th gear is commanded. • The condition that 4th gear is engaged when a shift to 4th gear is commanded occurs twice, and one of the following conditions is met: ○ When a shift to 1st gear is commanded, 3rd gear is engaged. ○ When a shift to 2nd gear is commanded, 3rd gear is engaged. ○ When a shift to 6th gear is commanded, 5th gear is engaged.	• Shift solenoid valve SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P2808: Shift solenoid valve SL4/OFF malfunction Shift solenoid valve SL4/ON malfunction
Required sensors/Components	Shift solenoid valve SL4, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous

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Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher

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Engine	Running

OFF malfunction (A):

ECM select gear	3rd
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL4	1600 kPa (12.2 kgf/cm ^{2} , 174 psi)
Throttle valve opening angle	3% or more

OFF malfunction (B):

ECM select gear	5th
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL4	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
Throttle valve opening angle	3% or more

OFF malfunction (C):

ECM select gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed of 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (A):

ECM select gear	1st
Time after transition to 1st gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4

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Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (B):

ECM select gear	2nd
Time after transition to 2nd gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (C):

ECM select gear	6th
Time after transition to 6th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (D):

ECM select gear	4th
Time after transition to 4th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more

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Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or (C)

OFF malfunction (A):

Turbine speed - Output speed x 3rd gear ratio	1000 rpm or more

OFF malfunction (B):

Turbine speed - Output speed x 5th gear ratio	1000 rpm or more

OFF malfunction (C):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.3

[ON malfunction]

One of the following conditions are met: ON malfunction (A), (B) or (C) and ON malfunction (D) 2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction (A) and (B):

Turbine speed / Output speed when output speed less than 1000 rpm	1.3 to 1.65

ON malfunction (C):

Turbine speed / Output speed when output speed less than 1000 rpm	0.6376 to 0.7376

ON malfunction (D):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

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- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P2808)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P2808 is output	A
P2808 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

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(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D

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ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)**

D ▶ **GO TO STEP 3**

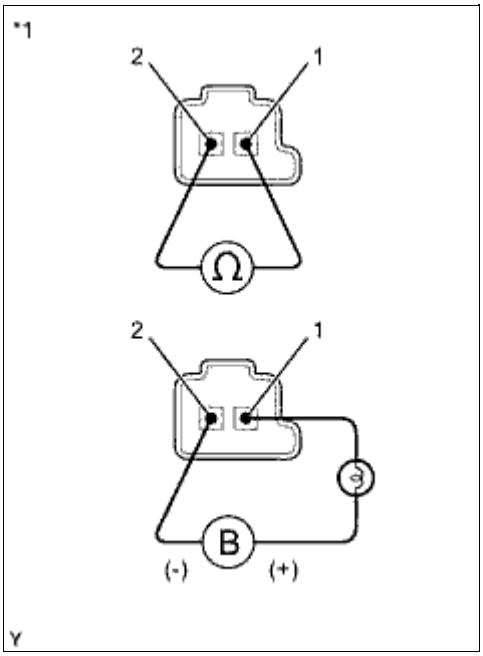
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

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(a) Remove shift solenoid valve SL4 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL4**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VR05PX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2810; Pressure Control Solenoid "G" Electrical (Shift Solenoid Valve SL4); 2016 MY Tacoma [08/2015 -]		

DTC	**P2810**	**Pressure Control Solenoid "G" Electrical (Shift Solenoid Valve SL4)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2810	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL4 circuit while driving and shifting gears (SL4 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL4 circuit • Shift solenoid valve SL4 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL4 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL4 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P2810: Shift solenoid valve SL4/Range check
Required sensors/Components	Shift solenoid valve SL4
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

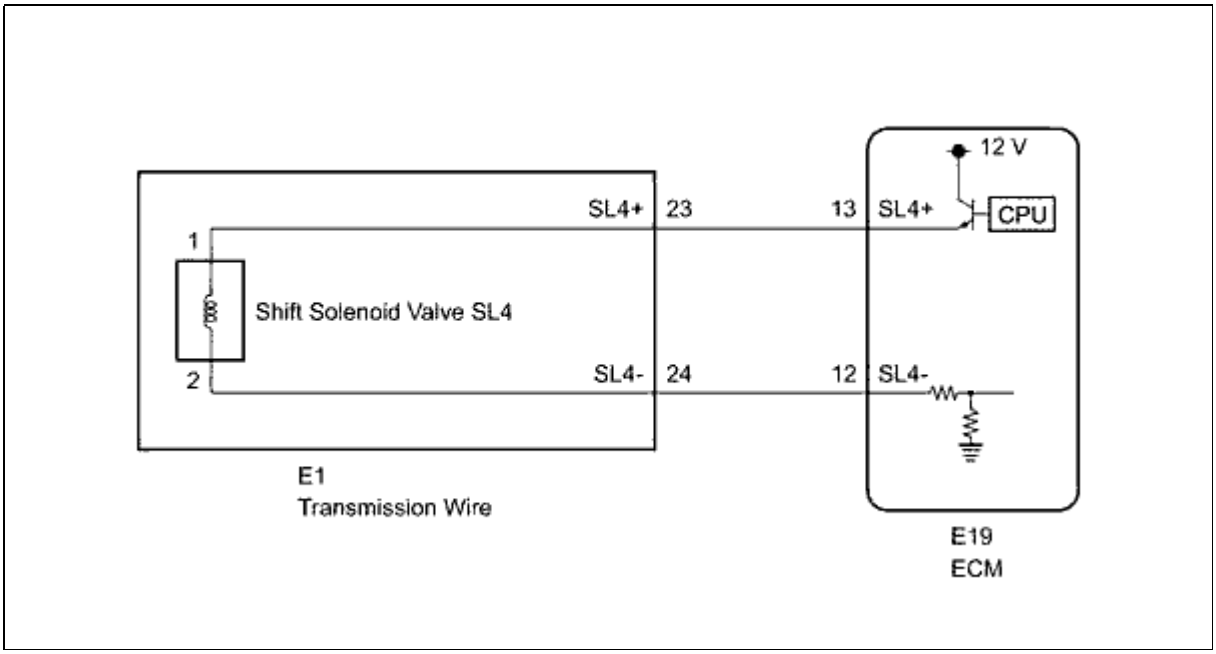
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL4 when the shift lever is in D:

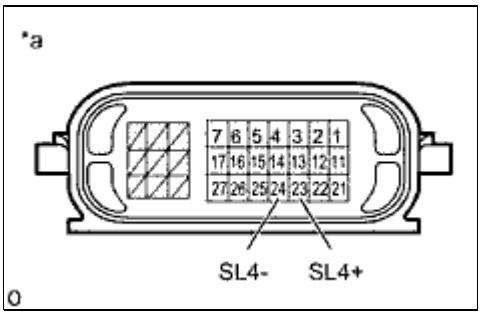
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL4)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
23 (SL4+) - 24 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
23 (SL4+) - Body ground	Always	10 kΩ or higher
24 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

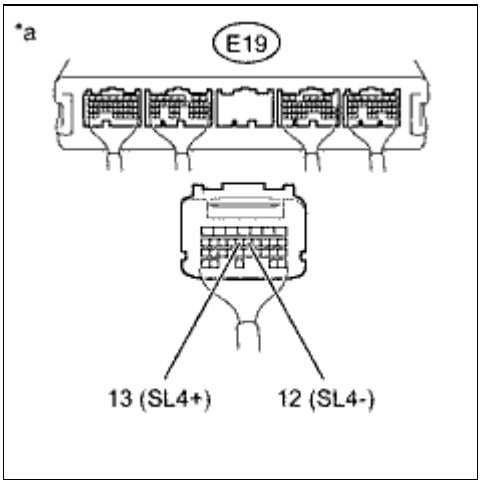
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-13 (SL4+) - E19-12 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
E19-13 (SL4+) - Body ground	Always	10 kΩ or higher
E19-12 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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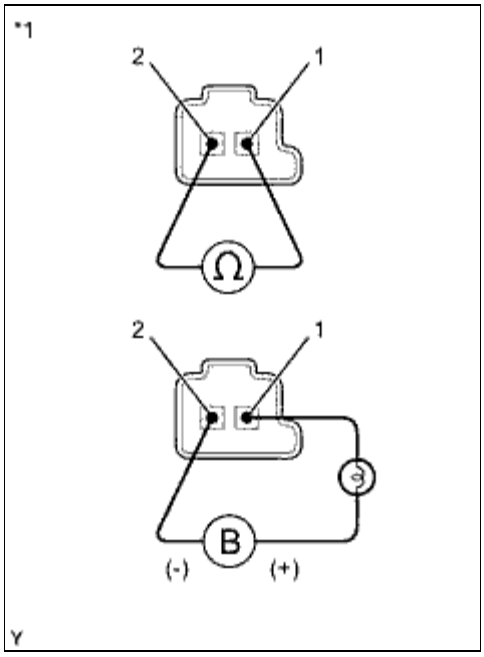
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

(a) Remove shift solenoid valve SL4 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL4

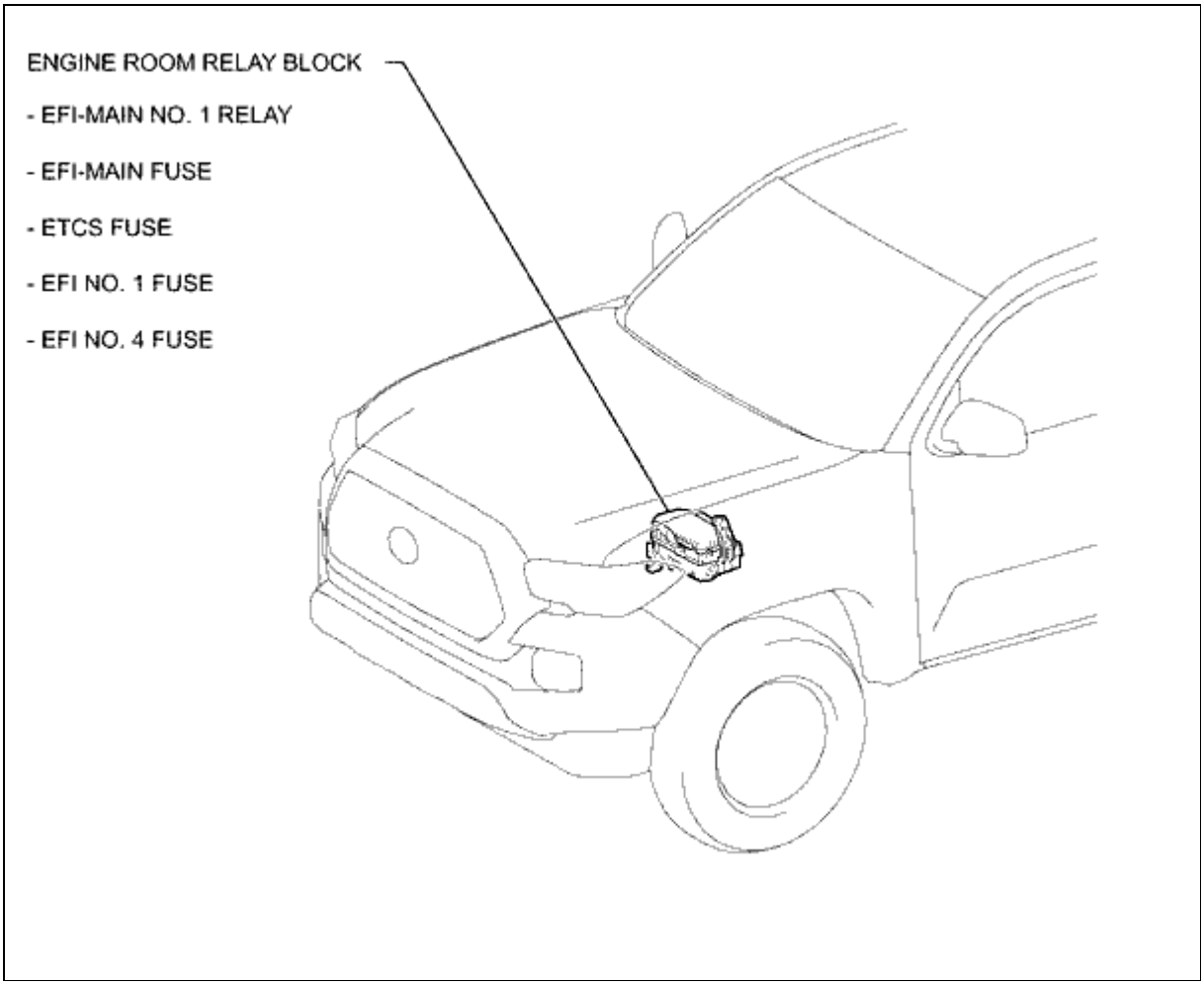
OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 R	**Doc ID:** RM000000W720LKX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): PARTS LOCATION; 2016 MY Tacoma [08/2015 -]		

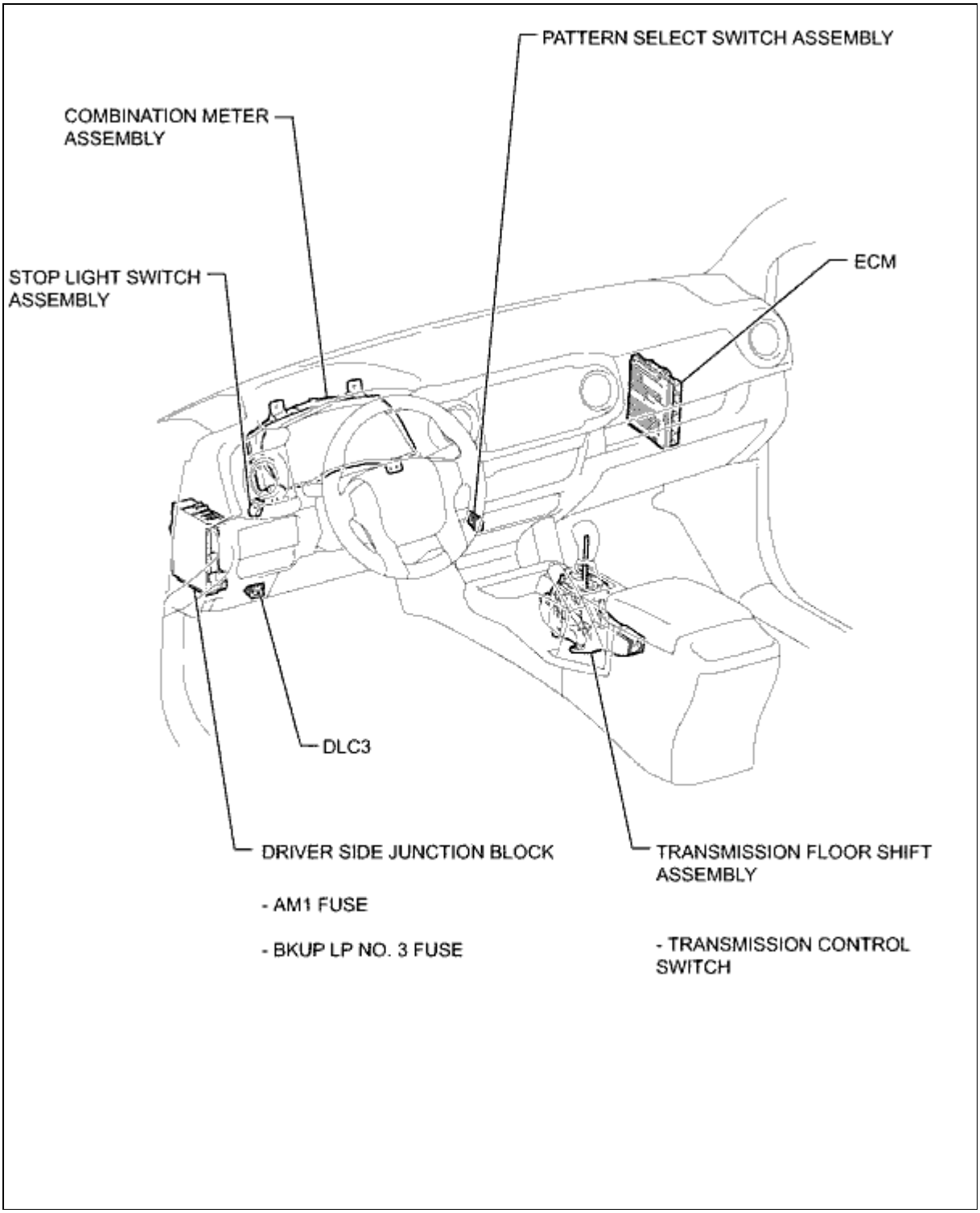
PARTS LOCATION

ILLUSTRATION



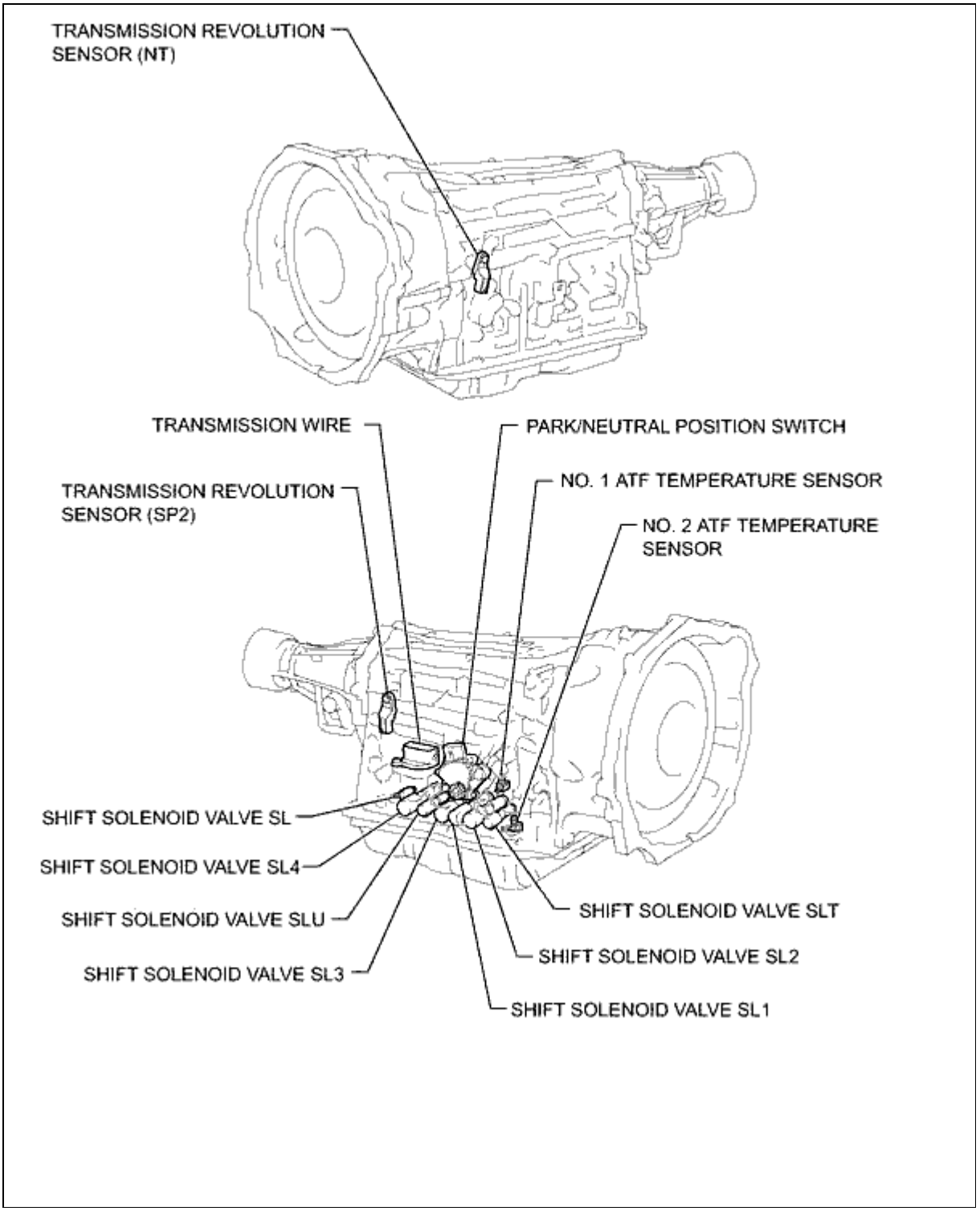
ILLUSTRATION

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ILLUSTRATION

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Last Modified: 11-13-2015	6.6 L	**Doc ID:** RM000000O7H0IUX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): PRECAUTION; 2016 MY Tacoma [08/2015 -]		

PRECAUTION

1. PRECAUTION

NOTICE:

- When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected INFO .
- Perform the Reset Memory procedures (A/T initialization) after replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves INFO .

HINT:

Reset Memory cannot be completed by only reconnecting the cable to the negative (-) battery terminal.

- If either of the following conditions is met, perform ATF Thermal Degradation Estimate Reset INFO .
  - The ATF has been replaced.

HINT:

If 50000 or more is displayed for the Data List item "ATF Thermal Degradation Estimate", thermal degradation of the ATF is suspected. Perform ATF Thermal Degradation Estimate Reset after replacing the ATF.

  - Approximately 50% or more of the ATF has been replaced during a repair of the transmission or a similar operation.
- Perform Registration (VIN registration) when replacing the ECM INFO .

CAUTION:

When using compressed air, always aim away from yourself to prevent Automatic Transmission Fluid (ATF) or kerosene from spraying on your face.

NOTICE:

- The automatic transmission is composed of precision-made parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect performance.
- The procedures are organized so that you work on only one component group at a time. This will help avoid confusion with similar-looking parts of different sub-assemblies being on your workbench at the same time.
- The component groups are inspected and repaired from the converter housing side.
- Whenever possible, complete the inspection, repair and reassembly before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.
- Use of Toyota Genuine ATF WS is recommended.
- All disassembled parts should be washed clean, and compressed air should be blown through any fluid passages and holes.
- Dry all parts with compressed air. Never use cloth.
- The recommended ATF or kerosene should be used for cleaning.
- After cleaning, the parts should be arranged in the order they were removed for efficient inspection, repairs and reassembly.
- New discs for the brakes and clutches that will be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
- All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF

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prior to reassembly.

- All old gaskets and rubber O-rings must be replaced.
- Do not apply adhesive cement to gaskets and similar parts.
- Make sure that the ends of the snap rings are not aligned with any cutouts. Also make sure that snap rings are correctly installed into the grooves.
- If a worn bushing is to be replaced, the sub-assembly containing the bushing must also be replaced.
- Check the thrust bearings and races for wear or damage. Replace them if necessary.
- Use petroleum jelly to keep parts in place.
- When working with seal packing material, the following must be observed:
    - Using a razor blade and a gasket scraper, remove all the old seal packing material from the gasket surface.
    - Thoroughly clean all components to remove any loose material.
    - Clean both sealing surfaces with a non-residue solvent.
    - Parts must be reassembled within 10 minutes of application. Otherwise, the seal packing material must be removed and reapplied.





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Last Modified: 11-13-2015	6.6 T	**Doc ID:** RM000000W7314OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): PROBLEM SYMPTOMS TABLE; 2016 MY Tacoma [08/2015 -]		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- The Matrix Chart is divided into 2 chapters. When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to 2, proceed as instructed.
- If the instruction "Proceed to Next Suspected Area Shown in Problem Symptoms Table" is given in the flowchart for each circuit, proceed to the next suspected area in the table.
- If the problem still occurs even though there are no malfunctions in any of the circuits, check the ECM and replace it if necessary.
- *: When the circuit is defective, a DTC may be output.

1. Chapter 1: Electronic Circuit Matrix Chart

SYMPTOM	SUSPECTED AREA	SEE PAGE
No up-shift (1st to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No up-shift (2nd to 3rd)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No up-shift (3rd to 4th)	Shift solenoid valve SL2 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (4th to 5th)	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (5th to 6th)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No down-shift (6th to 5th)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
No down-shift (5th to 4th)	Shift solenoid valve SL1 circuit*	INFO
	ECM	INFO
No down-shift (4th to 3rd)	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (3rd to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (2nd to 1st)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No lock-up or no lock-up off	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	Stop light switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO
	ECM	INFO
Shift point too high or too low	Throttle position sensor circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Park/neutral position switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO
	Pattern select switch power mode circuit*	INFO
	ECM	INFO
No gear change by moving shift lever to "+" or "-" while in S	Transmission control switch circuit	INFO
	ECM	INFO
Harsh engagement (N to D)	Shift solenoid valve SLT circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Harsh engagement (Any driving position)	Throttle position sensor circuit*	INFO
	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO
	ECM	INFO
Harsh engagement (Lock-up)	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	ECM	INFO
Poor acceleration	Shift solenoid valve SLT circuit*	INFO
	No. 2 ATF temperature sensor circuit*	INFO
	ECM	INFO
Shifting malfunction (Vehicle is stuck in 3rd or 5th gear)	ECM power source circuit	INFO
Changing gears takes time when up-shifting	Shift solenoid valve SL circuit*	INFO
No engine braking	ECM	INFO
No kick-down	ECM	INFO
Slip or shudder (5th to 6th and 6th to 5th)	Shift solenoid valve SL circuit*	INFO
ATF temperature warning indicator remains on	No. 2 ATF temperature sensor circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
Lock-up in 3rd gear	No. 2 ATF temperature sensor circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
Vehicle moves forward with shift lever in N	Park/neutral position switch circuit*	INFO
	ECM	INFO
Engine stalls when starting off or stopping	Shift solenoid valve SLU circuit*	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	ECM	INFO
Shifting malfunction	Park/neutral position switch circuit*	INFO
	Transmission control switch circuit	INFO
	ECM	INFO

2. Chapter 2: On-Vehicle Repair and Off-Vehicle Repair

SYMPTOM	SUSPECTED AREA	SEE PAGE
Vehicle does not move when shift lever is in any forward position or reverse position	Transmission control cable	INFO
	Manual valve	INFO
	Parking lock pawl	INFO
	Rear planetary gear unit	INFO
	Torque converter assembly	INFO
Vehicle does not move with shift lever in R	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
No up-shift (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO
	Shift solenoid valve SL2*	INFO
No up-shift (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL1*	INFO
No up-shift (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
No down-shift (6th to 5th)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (5th to 4th)	Shift solenoid valve SL1*	INFO
	No. 1 clutch (C1)	INFO
	Valve body assembly	INFO
No down-shift (4th to 3rd)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL2*	INFO
	Valve body assembly	INFO
No down-shift (3rd to 2nd)	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (2nd to 1st)	Valve body assembly	INFO
	Shift solenoid valve SL3*	INFO
No lock-up or No lock-up off	Valve body assembly	INFO
	Torque converter assembly	INFO
Harsh engagement (N to D)	Valve body assembly	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	Shift solenoid valve SL1*	INFO
Harsh engagement (Lock-up)	Valve body assembly	INFO
	Torque converter assembly	INFO
	Shift solenoid valve SLU*	INFO
Harsh engagement (N to R)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Harsh engagement (1st to 2nd to 3rd to 4th to 5th to 6th)	Valve body assembly	INFO
	Shift solenoid valve SLT*	INFO
Harsh engagement (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO
	Shift solenoid valve SL2*	INFO
Harsh engagement (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (6th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Slip or shudder (forward and reverse, after warm-up)	Transmission control cable	INFO
	Valve body assembly	INFO
	Oil strainer	INFO
	No. 1 brake (B1)	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
	Torque converter assembly	INFO
Slip or shudder (particular position, just after engine starts)	Torque converter assembly	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Slip or shudder (shift lever in R)	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
Slip or shudder (1st)	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (2nd)	No. 1 brake (B1)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (3rd)	No. 3 brake (B3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (4th)	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (5th)	No. 3 brake (B3)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO
No engine braking (1st to 4th, shift lever in S)	No. 1 clutch (C1)	INFO
No engine braking (1st)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 1 clutch (C1)	INFO
No kick-down	Valve body assembly	INFO
Shift point too high or too low	Valve body assembly	INFO
Poor acceleration (All positions)	Valve body assembly	INFO
	Torque converter assembly	INFO
Poor acceleration (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO
	Front planetary gear unit	INFO
Engine stalls when starting off or stopping	Valve body assembly	INFO
	Torque converter assembly	INFO

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Last Modified: 11-13-2015	6.6 J	**Doc ID:** RM0000031IU03MX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): Pattern Select Switch Power Mode Circuit; 2016 MY Tacoma [08/2015 -]		

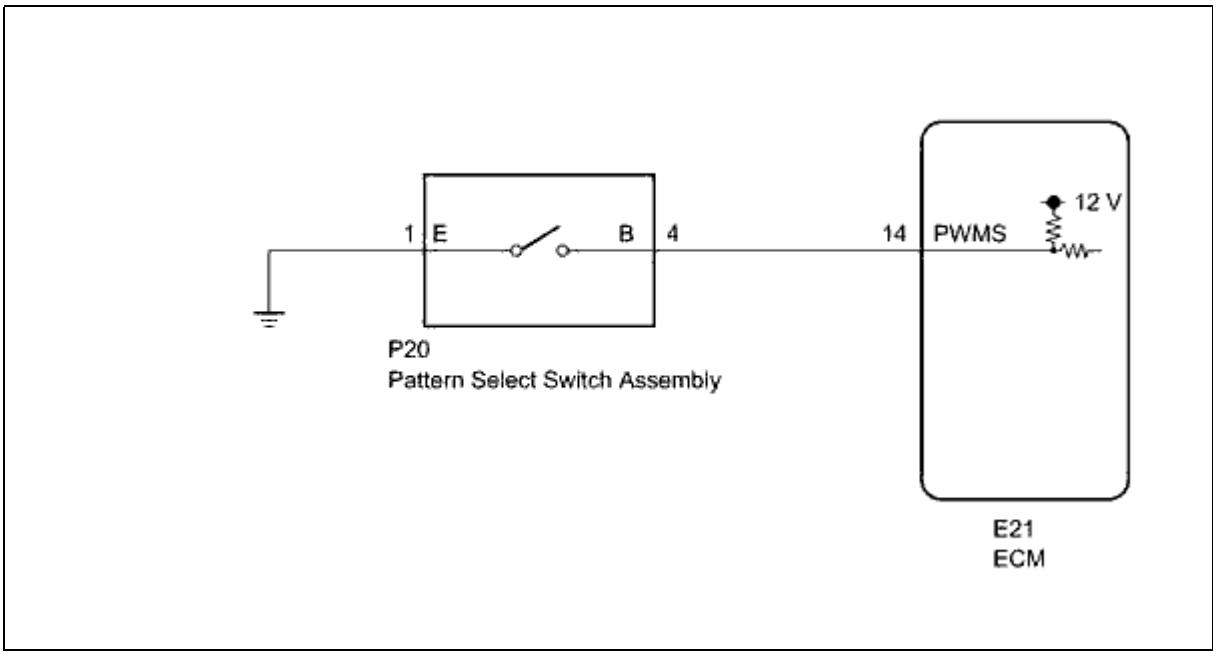
Pattern Select Switch Power Mode Circuit

DESCRIPTION

The ECM memory contains the programs for the normal and PWR shift patterns.

By following the programs corresponding to the signals from the pattern select switch assembly, park/neutral position switch and other various sensors, the ECM switches the shift solenoid valves on and off, and controls the transmission gear ratio.

WIRING DIAGRAM



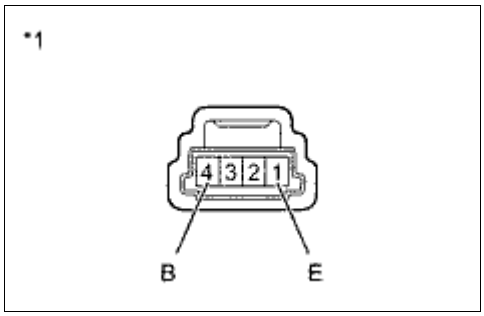
INSPECTION PROCEDURE

PROCEDURE

1.	**INSPECT PATTERN SELECT SWITCH ASSEMBLY**

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(a) Remove the pattern select switch assembly INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 (E) - 4 (B)	Pattern select switch assembly pushed	Below 1 Ω
1 (E) - 4 (B)	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

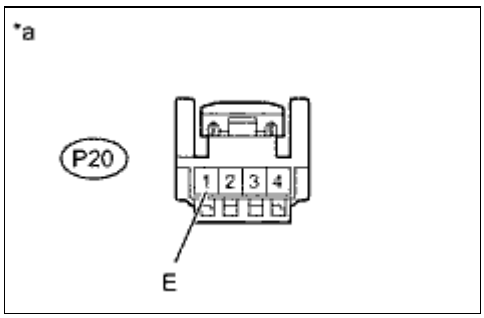
*1	Pattern Select Switch Assembly

NG ▶ **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - BODY GROUND)**

(a) Disconnect the pattern select switch assembly connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P20-1 (E) - Body ground	Always	Below 1 Ω

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Text in Illustration

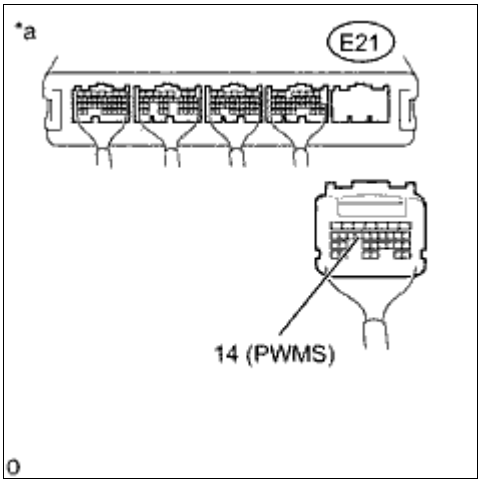
*a	Front view of wire harness connector (to Pattern Select Switch Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
E21-14 (PWMS) - Body ground	Pattern select switch assembly pushed	Below 1 Ω
E21-14 (PWMS) - Body ground	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W790TIX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): ROAD TEST; 2016 MY Tacoma [08/2015 -]		

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

(a) Based on the result of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transmission does not shift up or down, or that the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and attempt to duplicate the problem symptoms.

2. ROAD TEST

(a) Perform a road test.

CAUTION:

Check for safety before performing any tests.

NOTICE:

- Be sure to inspect and adjust the engine before performing these tests.
- Perform the road test with the engine coolant temperature is 70°C (158°F) or higher and the ATF temperature between 40 and 110°C (104 and 230°F).
- Perform these tests with the air conditioning and cruise control off.

INSPECTION	PROCEDURE
Transmission Control Switch Test	With the vehicle stationary and the shift lever in D, move the shift lever to S and return it to D. Check that the meter display changes from D to the appropriate S range and then back again.
S Position Test	With the vehicle stationary and the shift lever in S, move the shift lever to "+" and "-". Check that the meter display changes between S ranges properly.
D Position Shift Test	While driving the vehicle normally, check that the transmission shifts up and down through each gear properly.
Lock-up Function	While driving on a level surface at a constant speed in the lock-up range with the shift lever in D, lightly depress the accelerator pedal and check that the engine speed does not change abruptly.
P Position Test	Stop the vehicle on an incline (approximately 5° or more). Then move the shift lever to P and release the parking brake. Check that the parking lock pawl holds the vehicle in place.
Abnormal Noise and Vibration	Check for abnormal noise and vibration while driving the vehicle forward and backward, and during shift operations.
Fluid Leakage	After performing all other road test inspections, check for fluid leakage.

HINT:

When checking for DTCs after a repair, drive the vehicle according to the monitor drive pattern INFO .

(b) Shift schedule confirmation

(1) Connect the Techstream to the DLC3.

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(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Engine and ECT / Data List / Vehicle Speed, Accelerator Position and Shift Status.

(5) Check that the "Shift Status" changes in accordance with the "Vehicle Speed" as shown in the following table.

Shift Schedule Chart

ACCELERATOR POSITION	6%				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	5 to 15 km/h (3 to 9 mph)	20 to 25 km/h (12 to 16 mph)	30 to 40 km/h (18 to 25 mph)	50 to 60 km/h (31 to 37 mph)	60 to 70 km/h (37 to 44 mph)

NOTICE:

- All vehicle speeds indicated in the above table are actual values. Therefore, if checking a shift point with a chassis dynamometer, keep in mind that there is a margin of error in the chassis dynamometer indication.
- If checking a shift point against the vehicle speed indicated on the speedometer, remember to consider the speedometer correction rate and margin of error in the Techstream indication.

(c) Lock-up confirmation

(1) Connect the Techstream to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Engine and ECT / Data List / Vehicle Speed, Engine Speed, Accelerator Position, SPD (NT), A/T Oil Temperature 1, Lock Up and Shift Status.

(5) When the following conditions are met, check that the difference between "Engine Speed" and "SPD (NT)" is 50 rpm or less.

Lock-up Schedule

Accelerator Position	6%
Vehicle Speed	80 km/h (50 mph) or more
Shift Status	6th gear
Lock Up	ON

HINT:

Lock-up prohibition conditions:

- A/T oil temperature is below 40°C (104°F)
- Engine coolant temperature is below 70°C (158°F)
- Shift range between "1" (S1 range) and "3" (S3 range)
- Accelerator pedal is fully released
- Stop light switch signal is on

(d) Manual down-shift permission speed

(1) Manual down-shift is permitted for each shift status when the vehicle speed is below the corresponding range shown in the following table.

Manual Down-shift Permission Speed Chart

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SHIFT STATUS (SHIFT LEVER IN S)	S6 TO S5	S5 TO S4	S4 TO S3	S3 TO S2	S2 TO S1
Vehicle Speed	240 to 255 km/h (149 to 158 mph)	165 to 180 km/h (103 to 112 mph)	110 to 120 km/h (68 to 75 mph)	70 to 80 km/h (43 to 50 mph)	35 to 40 km/h (22 to 25 mph)

(e) Shift schedule when accelerator pedal is fully depressed

Shift Schedule Chart

ACCELERATOR PEDAL	FULLY DEPRESSED				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	35 to 40 km/h (22 to 25 mph)	75 to 85 km/h (47 to 53 mph)	110 to 125 km/h (68 to 78 mph)	165 to 180 km/h (103 to 112 mph)	320 to 335 km/h (198 to 208 mph)

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W750TMX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): SYSTEM DESCRIPTION; 2016 MY Tacoma [08/2015 -]		

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The Electronic Controlled Automatic Transmission (ECT) is an automatic transmission that has its shift timing electronically controlled by the ECM. The ECM detects electrical signals that indicate engine and driving conditions, and controls the shift point, based on driver's habits and road conditions. As a result, fuel efficiency and transmission performance are improved.

Shift shock has been reduced by controlling the engine and transmission simultaneously.

In addition, the ECT has features such as:

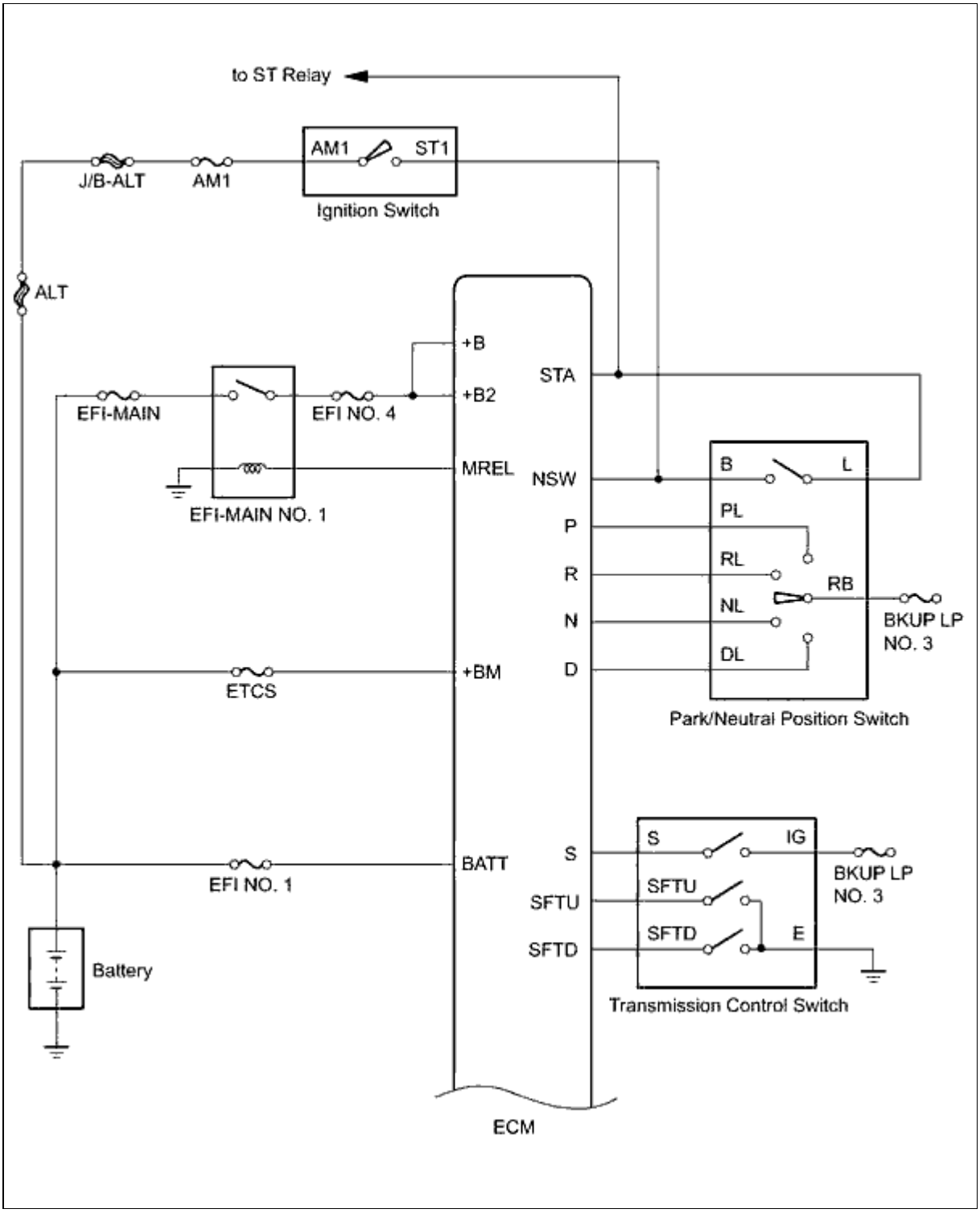
- Diagnostic function.
- Fail-safe function for use when a malfunction occurs.

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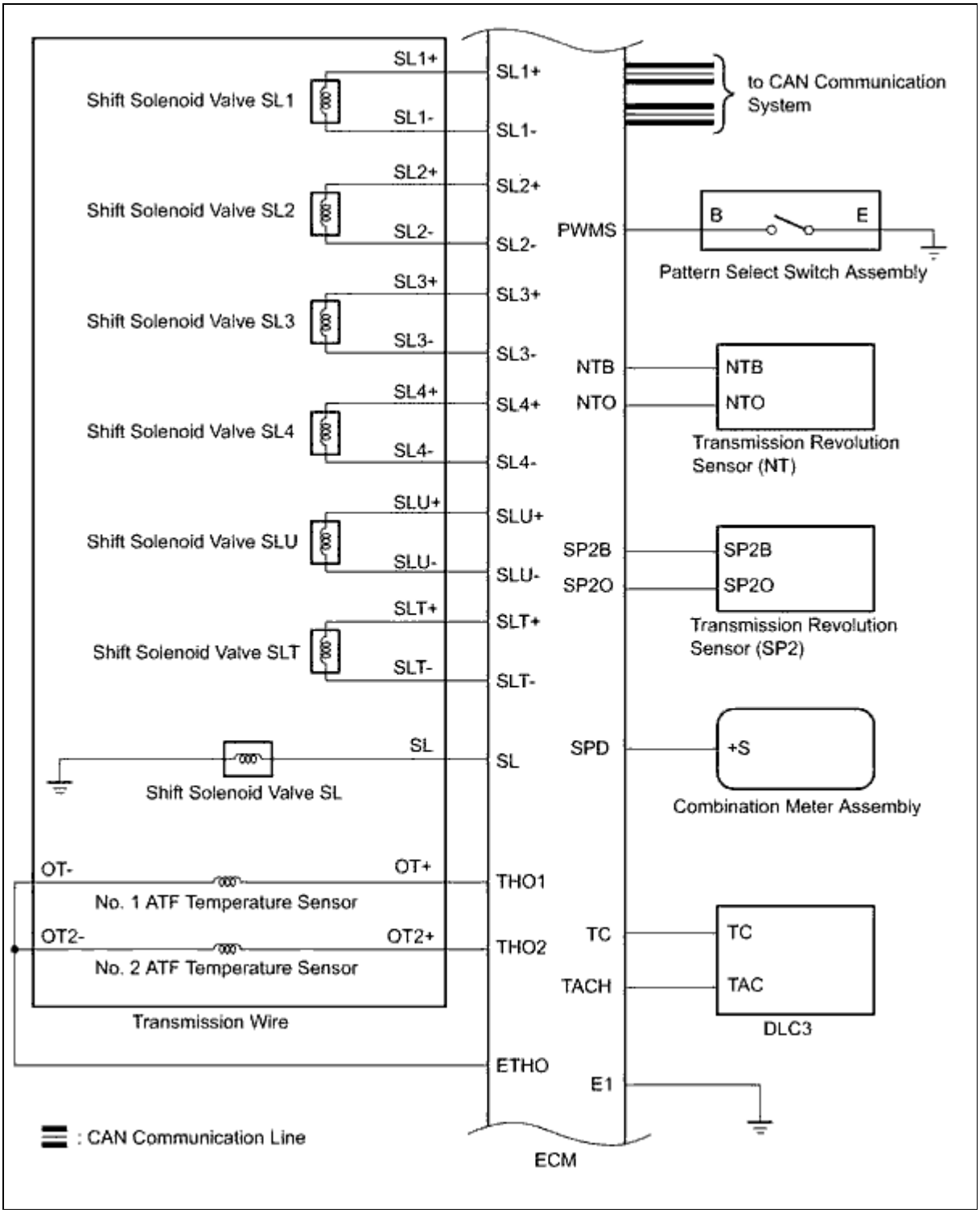
Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7D0M0X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): SYSTEM DIAGRAM; 2016 MY Tacoma [08/2015 -]		

SYSTEM DIAGRAM

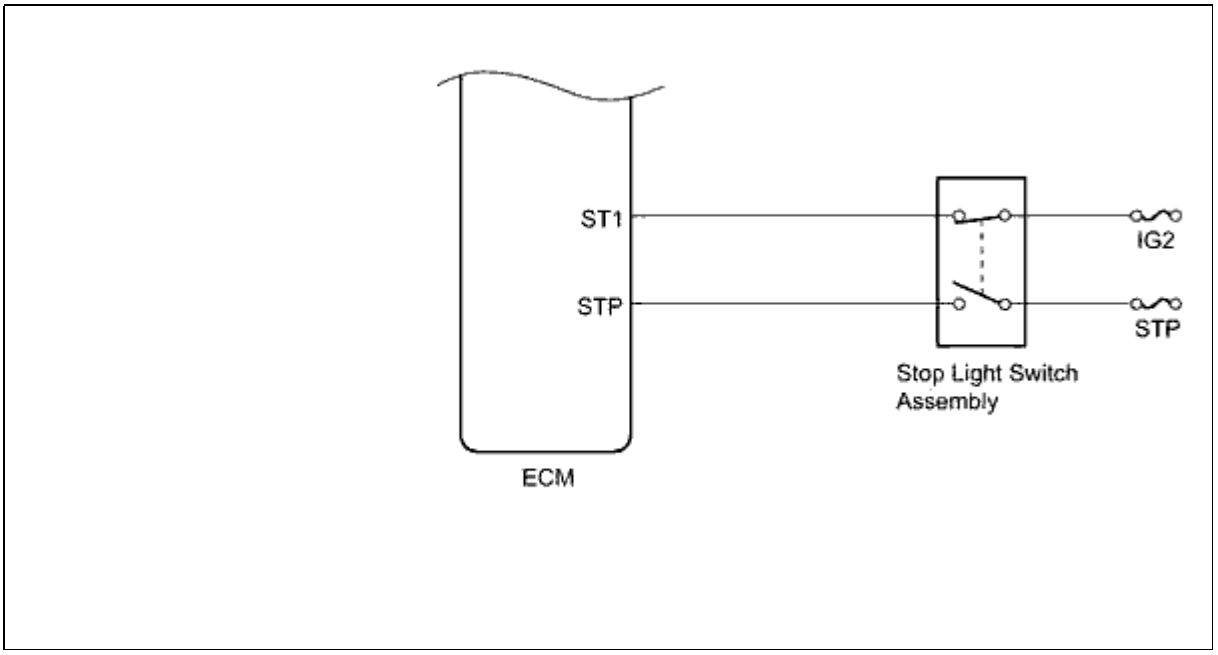
The configuration of the electronic control system in the AC60E automatic transmission is as shown in the following chart.



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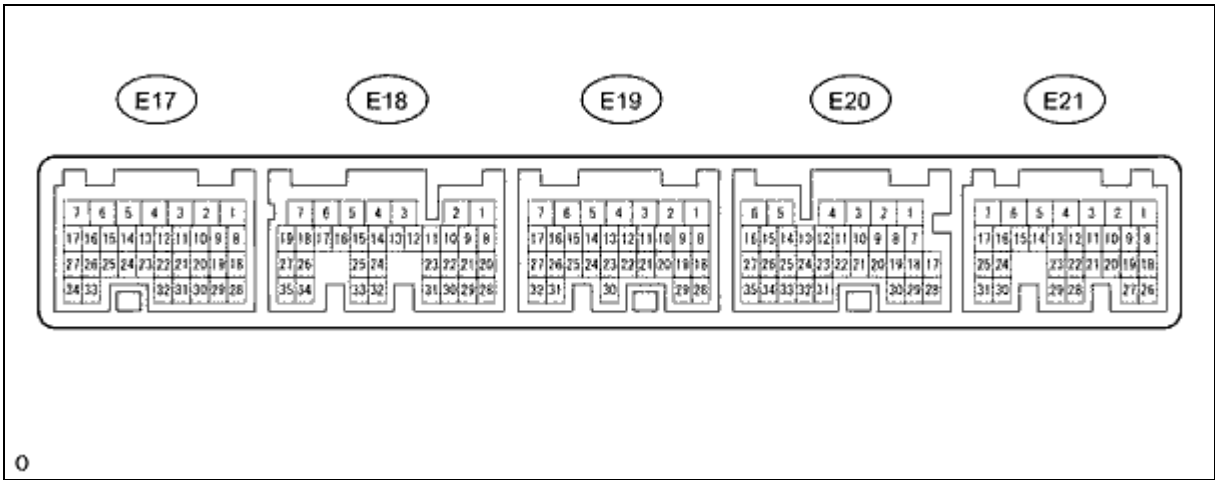


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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000137007DX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): TERMINALS OF ECM; 2016 MY Tacoma [08/2015 -]		

TERMINALS OF ECM

1. ECM



HINT:

The standard voltage between each pair of ECM terminals is shown in the table below. In the table, first follow the information under "Condition". Look under "Terminal No. (Symbol)" for the terminals to be inspected. The standard voltage between the terminals is shown under "Specified Condition".

Use the illustration above as a reference for the ECM terminals.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E18-9 (SP2O) - E17-3 (E1)	L - W-B	Transmission revolution sensor (SP2) signal	Vehicle driving	Pulse generation
E18-10 (SP2B) - E17-3 (E1)	G - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E18-12 (SL) - E17-3 (E1)	R - W-B	Shift solenoid valve SL signal	All gears	11 to 14 V
E18-15 (NSW) - E17-3 (E1)	V - W-B	Park/neutral position switch signal	Ignition switch ON and shift lever in P or N	Below 1 V
			Ignition switch ON and shift lever not in P or N	11 to 14 V
E19-2 (SLU+) - E19-1 (SLU-)	P - L	Shift solenoid valve SLU signal	2nd, 3rd, 4th, 5th or 6th gear (Flex lock-up on)	Pulse generation
E19-5 (SLT+) - E19-4 (SLT-)	LG - Y	Shift solenoid valve SLT signal	Engine idling	Pulse generation
E19-7 (SL2+) - E19-6 (SL2-)	GR - BE	Shift solenoid valve SL2 signal	4th, 5th or 6th gear	Pulse generation

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E19-9 (SL1+) - E19-8 (SL1-)	R - V	Shift solenoid valve SL1 signal	1st, 2nd, 3rd or 4th gear	Pulse generation
E19-13 (SL4+) - E19-12 (SL4-)	SB - BE	Shift solenoid valve SL4 signal	3rd or 5th gear	Pulse generation
E19-16 (SL3+) - E19-15 (SL3-)	B - W	Shift solenoid valve SL3 signal	2nd or 6th gear	Pulse generation
E19-17 (SFTU) - E17-3 (E1)	SB - W-B	Up-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "+" (Up-shift)	Below 1 V
E19-19 (NTO) - E17-3 (E1)	W - W-B	Transmission revolution sensor (NT) signal	Engine idling	Pulse generation
E19-20 (THO1) - E19-21 (ETHO)	P - V	No. 1 ATF temperature sensor signal	No. 1 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E19-22 (THO2) - E19-21 (ETHO)	L - V	No. 2 ATF temperature sensor signal	No. 2 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E19-24 (N) - E17-3 (E1)	G - W-B	N shift position switch signal	Ignition switch ON and shift lever in N	11 to 14 V
			Ignition switch ON and shift lever not in N	Below 1 V
E19-25 (P) - E17-3 (E1)	GR - W-B	P shift position switch signal	Ignition switch ON and shift lever in P	11 to 14 V
			Ignition switch ON and shift lever not in P	Below 1 V
E19-27 (SFTD) - E17-3 (E1)	R - W-B	Down-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "-" (Down-shift)	Below 1 V
E19-29 (NTB) - E17-3 (E1)	Y - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E19-30 (S) - E17-3 (E1)	B - W-B	S shift position switch signal	Ignition switch ON and shift lever in S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in S, "+" or "-"	Below 1 V
E20-8 (R) - E17-3 (E1)	V - W-B	R shift position switch signal	Ignition switch ON and shift lever in R	11 to 14 V
			Ignition switch ON and shift lever not in R	Below 1 V
E20-13 (CANH) - E17-3 (E1)	B - W-B	CAN communication line	Ignition switch ON	Pulse generation

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E20-14 (CANL) - E17-3 (E1)	W - W-B	CAN communication line	Ignition switch ON	Pulse generation
E20-18 (D) - E17-3 (E1)	SB - W-B	D shift position switch signal	Ignition switch ON and shift lever in D, S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in D, S, "+" or "-"	Below 1 V
E21-14 (PWMS) - E17-3 (E1)	P - W-B	Pattern select switch signal	Ignition switch ON and pattern select switch pushed	Below 1 V
			Ignition switch ON and pattern select switch not pushed	11 to 14 V

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Last Modified: 11-13-2015	6.6 J	**Doc ID:** RM000000WP10L4X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): Transmission Control Switch Circuit; 2016 MY Tacoma [08/2015 -]		

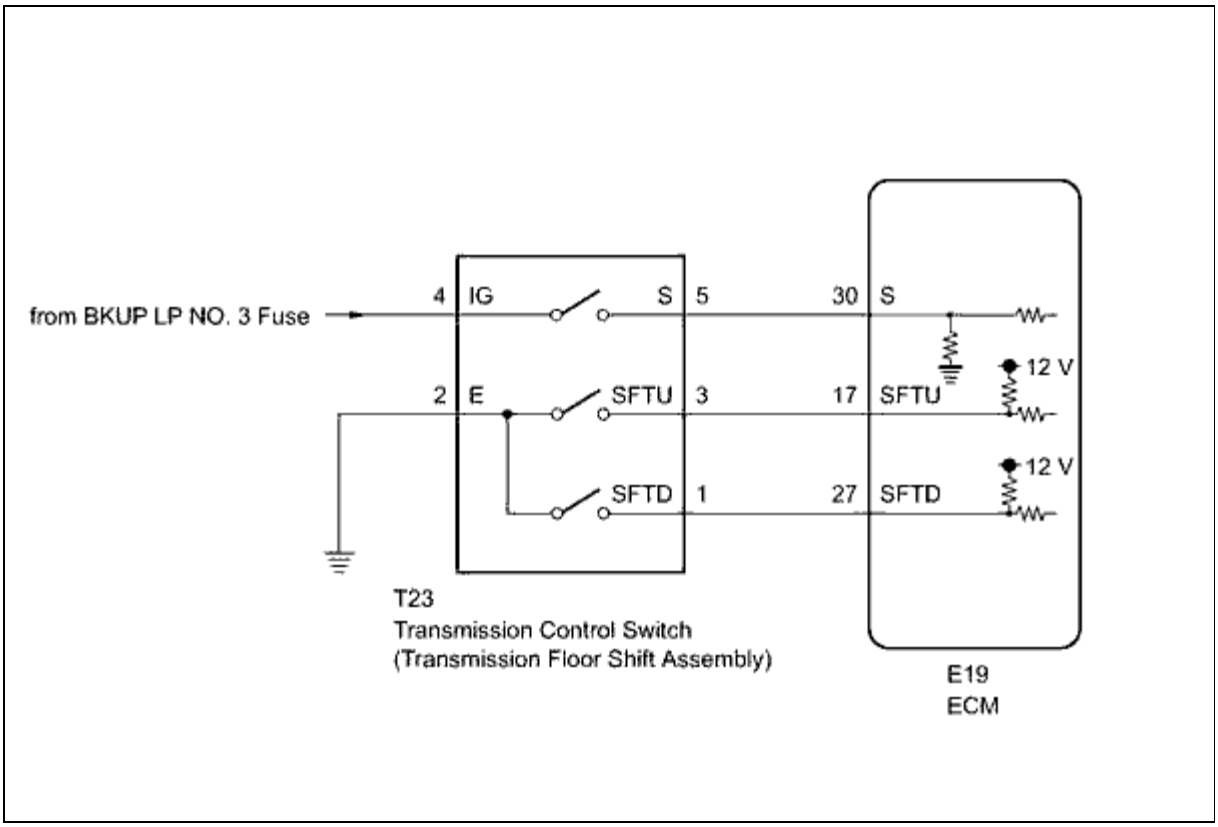
Transmission Control Switch Circuit

DESCRIPTION

After moving the shift lever to S, it is possible to switch the shift range between "1" (S1 range) and "6" (S6 range) using the transmission control switch.

Moving the shift lever to "+" once raises the shift range by one, and moving the shift lever to "-" once lowers the shift range by one.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPORTS MODE SELECTION SW)**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-

Result

RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 6**

A ▼

2.	**READ VALUE USING TECHSTREAM (SPORTS SHIFT UP SW AND SPORTS SHIFT DOWN SW)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Shift Up SW	Sport shift up switch status/ ON or OFF	• ON: Shift lever held in "+" (up-shift) • OFF: Shift lever not held in "+" (up-shift)	-
Sports Shift Down SW	Sport shift down switch status/ ON or OFF	• ON: Shift lever held in "-" (down-shift) • OFF: Shift lever not held in "-" (down-shift)	-

Result

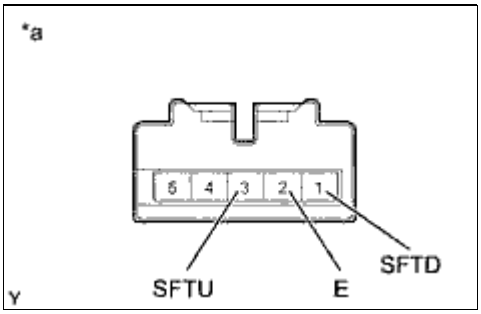
RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 3**

A ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

3.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

(a) Disconnect T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever held in "+" (Up-shift)	Below 1 Ω
1 (SFTD) - 2 (E)	Shift lever held in "-" (Down-shift)	Below 1 Ω

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever not held in "+"	10 kΩ or higher
1 (SFTD) - 2 (E)	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

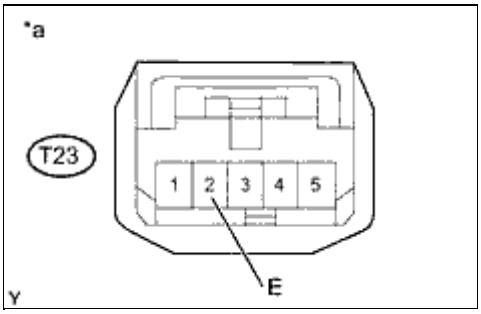
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

4.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - BODY GROUND)**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-2 (E) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

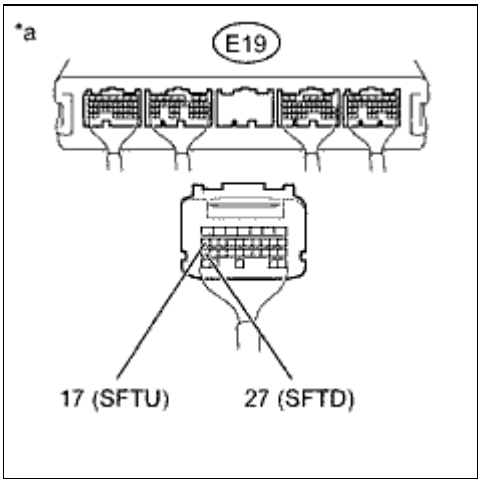
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

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5.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-17 (SFTU) - Body ground	Shift lever held in "+" (Up-shift)	Below 1 Ω
E19-27 (SFTD) - Body ground	Shift lever held in "-" (Down-shift)	Below 1 Ω
E19-17 (SFTU) - Body ground and other terminals	Shift lever not held in "+"	10 kΩ or higher
E19-27 (SFTD) - Body ground and other terminals	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

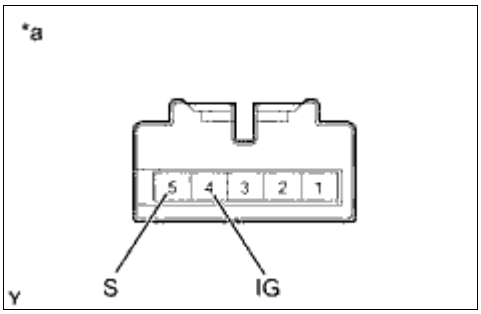
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

6.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

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(a) Disconnect T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "- "	Below 1 Ω
4 (IG) - 5 (S)	Shift lever not in S, "+" or "-"	10 kΩ or higher

Text in Illustration

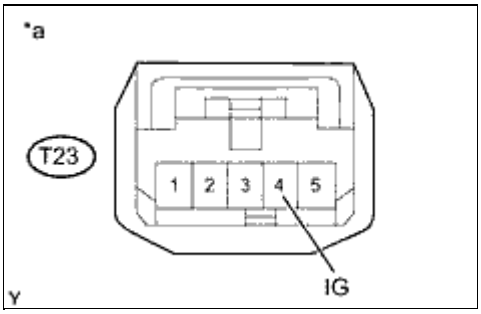
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

7.	**CHECK HARNESS AND CONNECTOR (BATTERY - TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY))**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T23-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
T23-4 (IG) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

8.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - ECM)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.

(b) Disconnect the E19 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-5 (S) - E19-30 (S)	Always	Below 1 Ω
T23-5 (S) - Body ground	Always	10 kΩ or higher
E19-30 (S) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

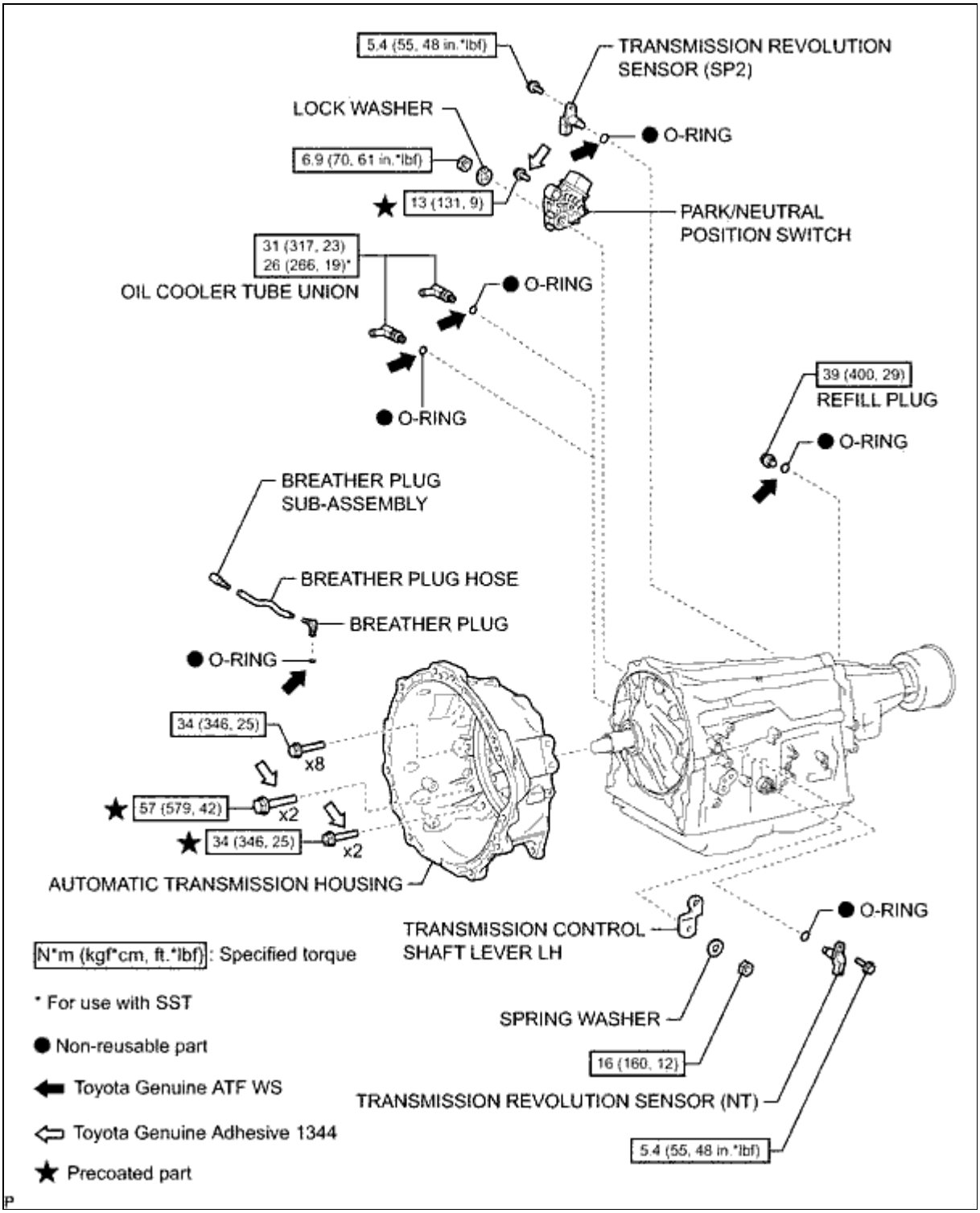
OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000O9X043X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

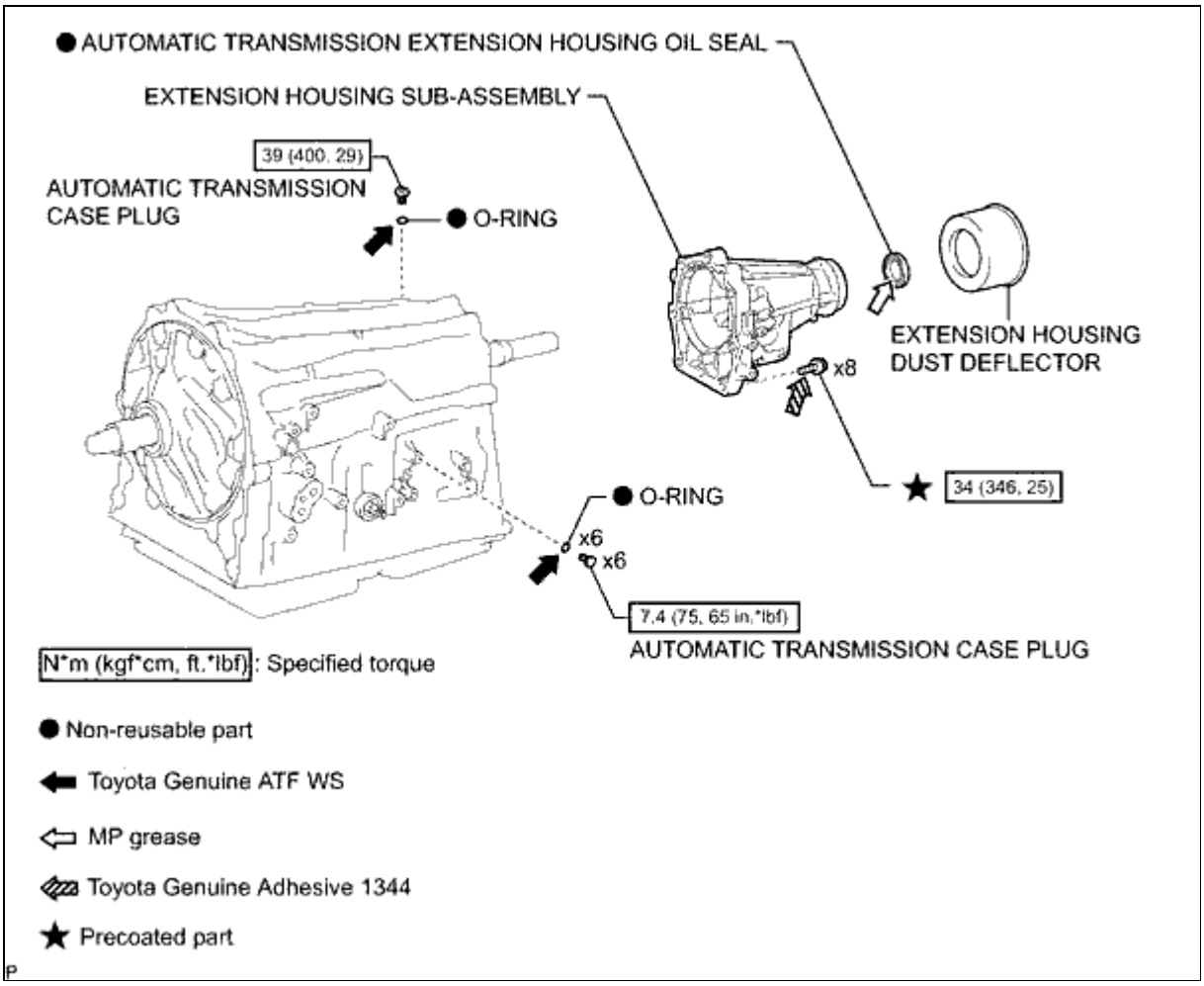
COMPONENTS

ILLUSTRATION



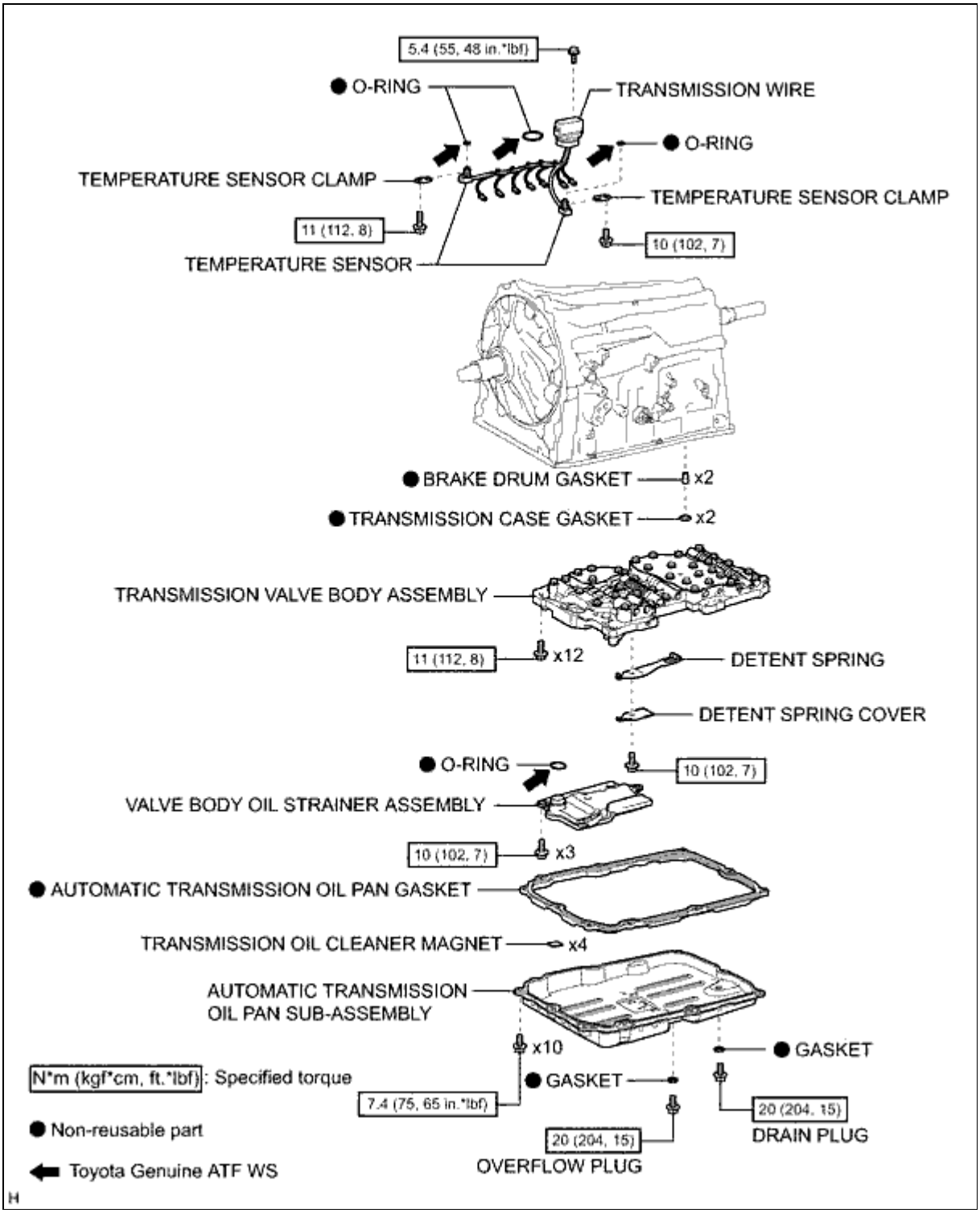
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ILLUSTRATION



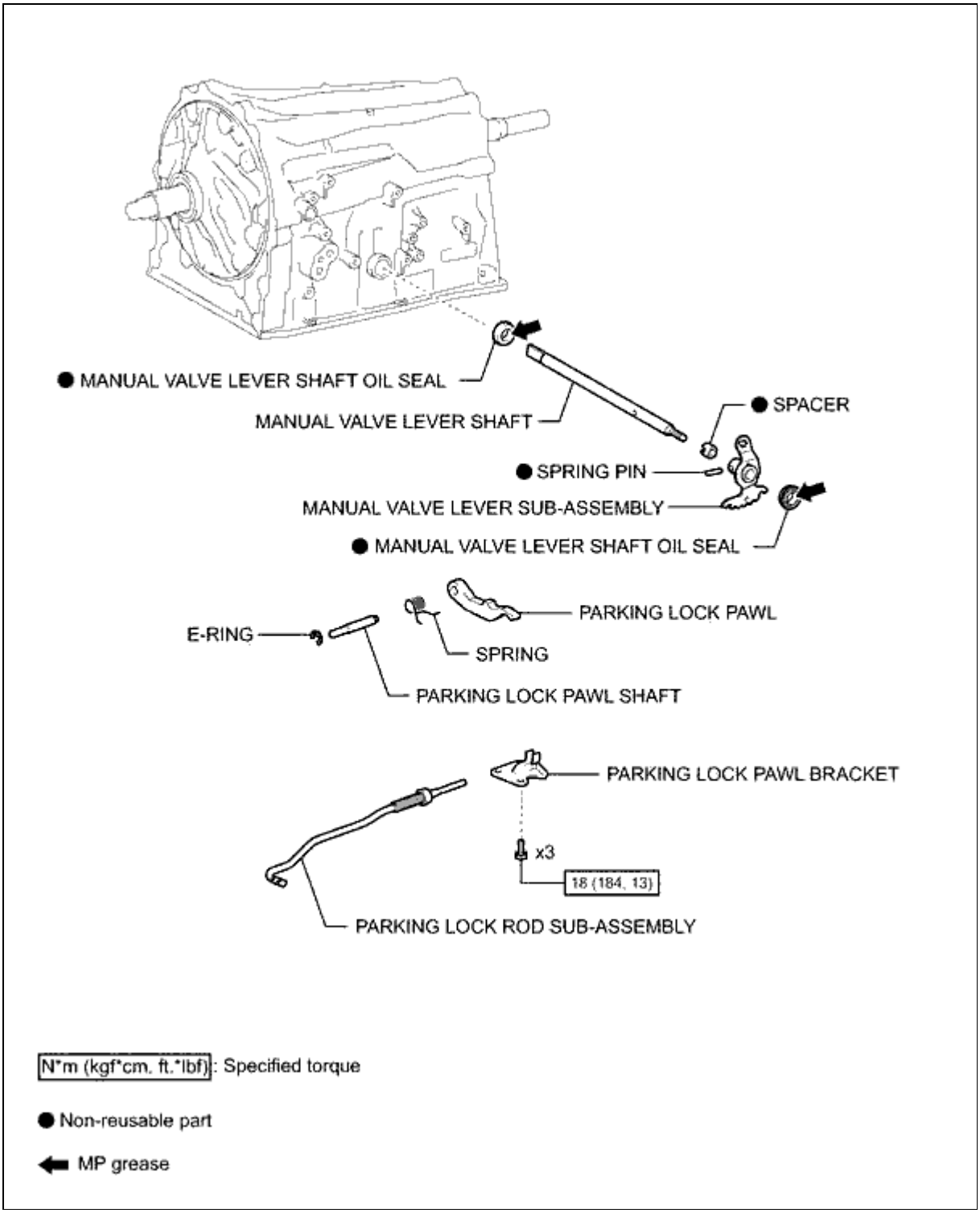
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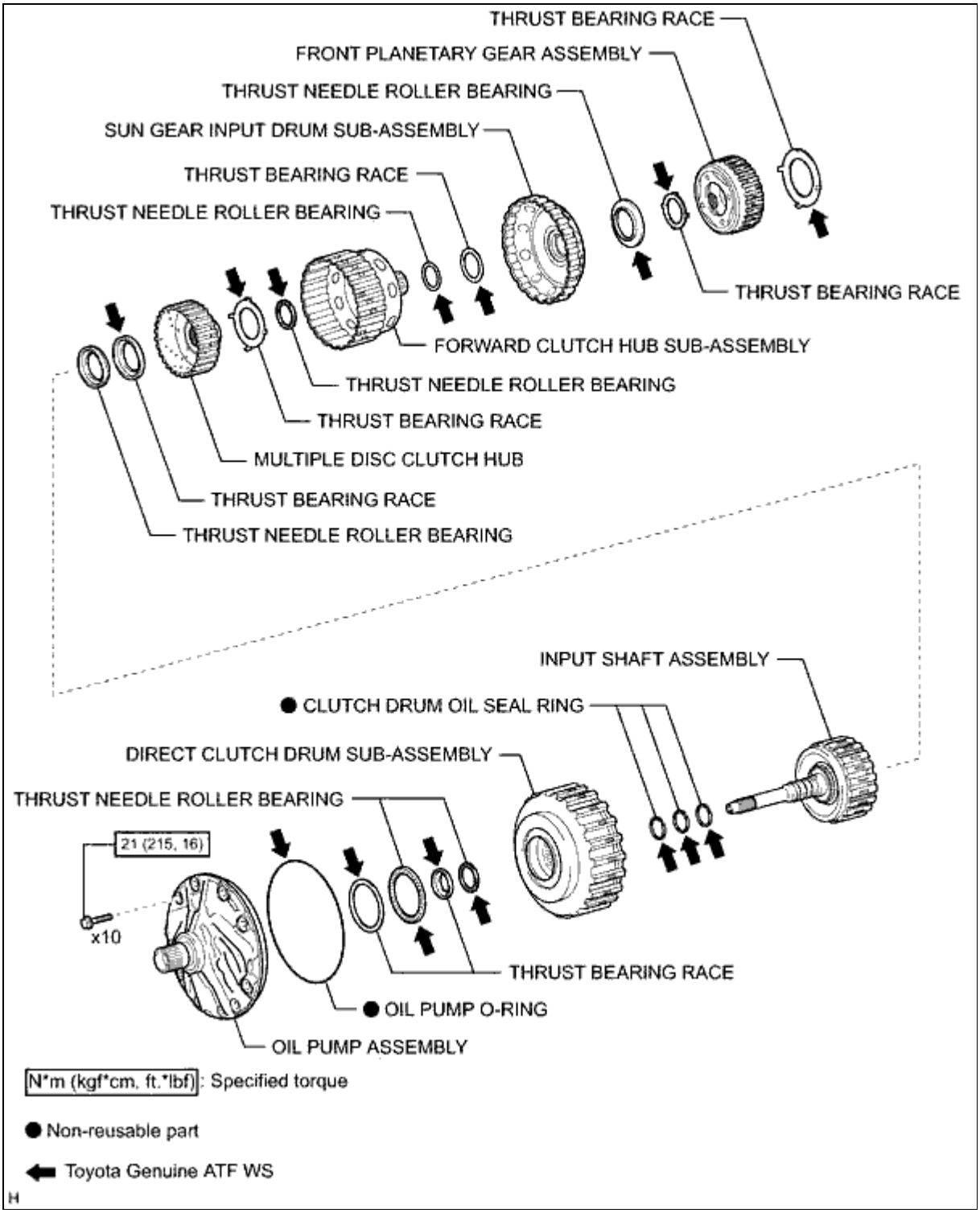
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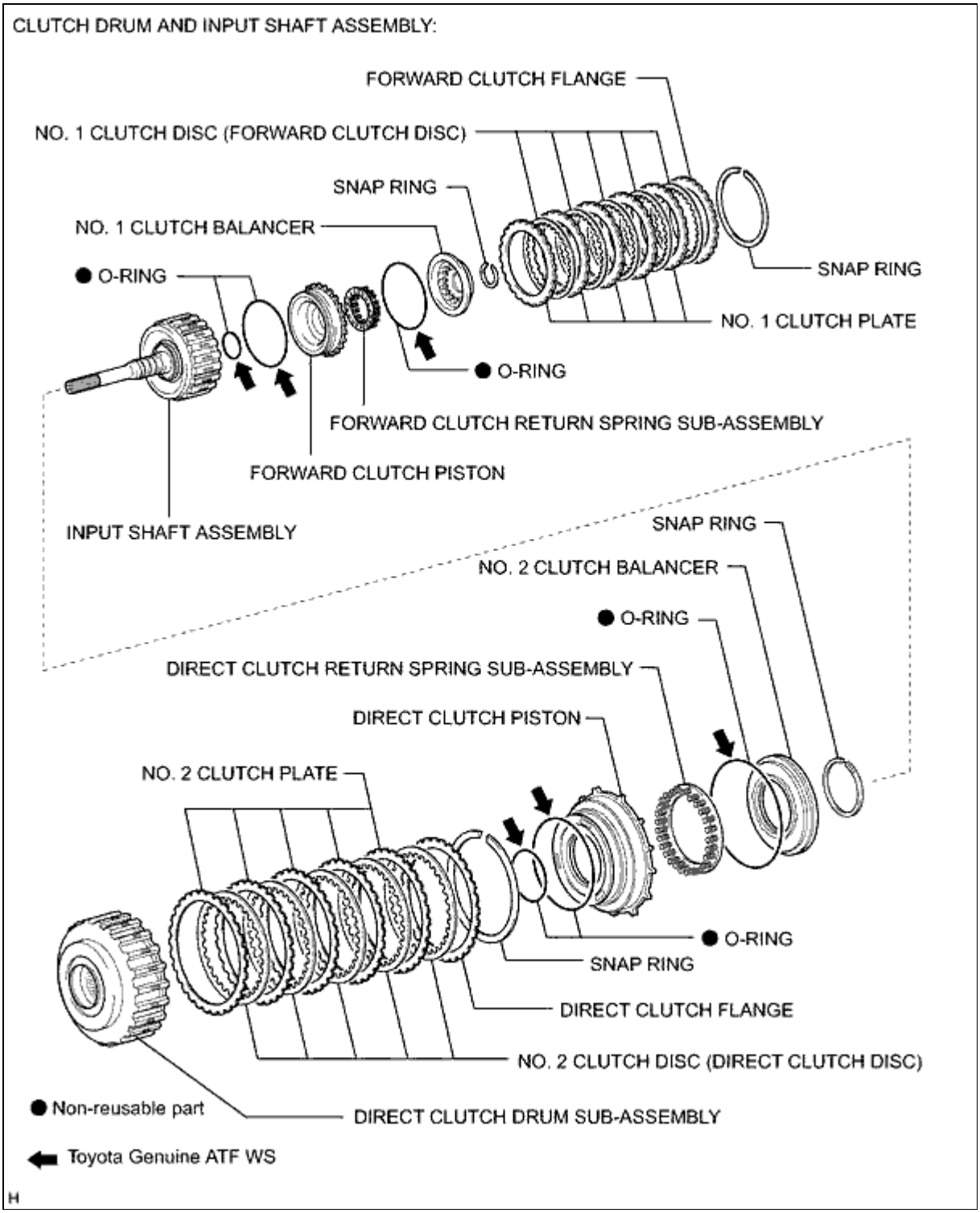
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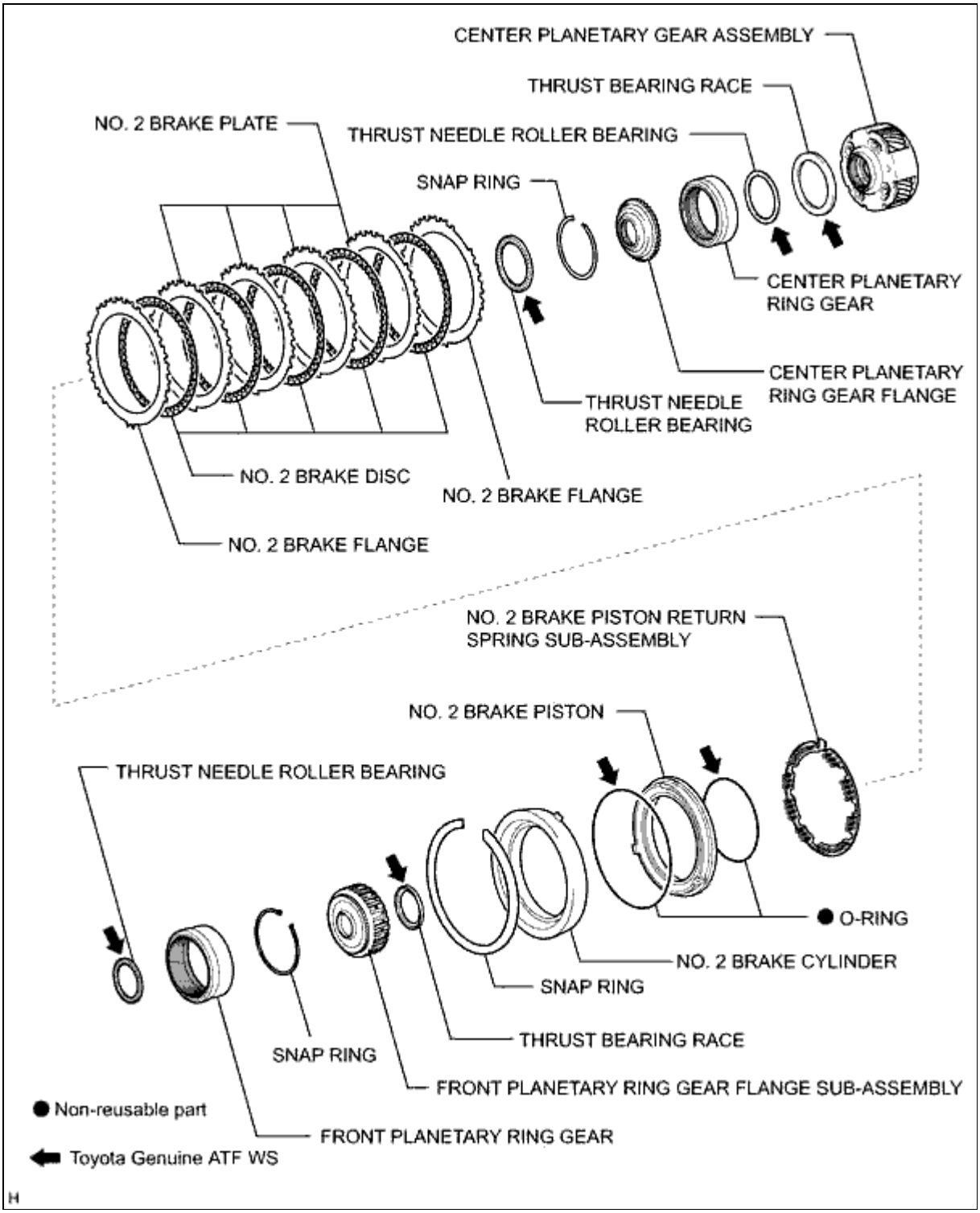
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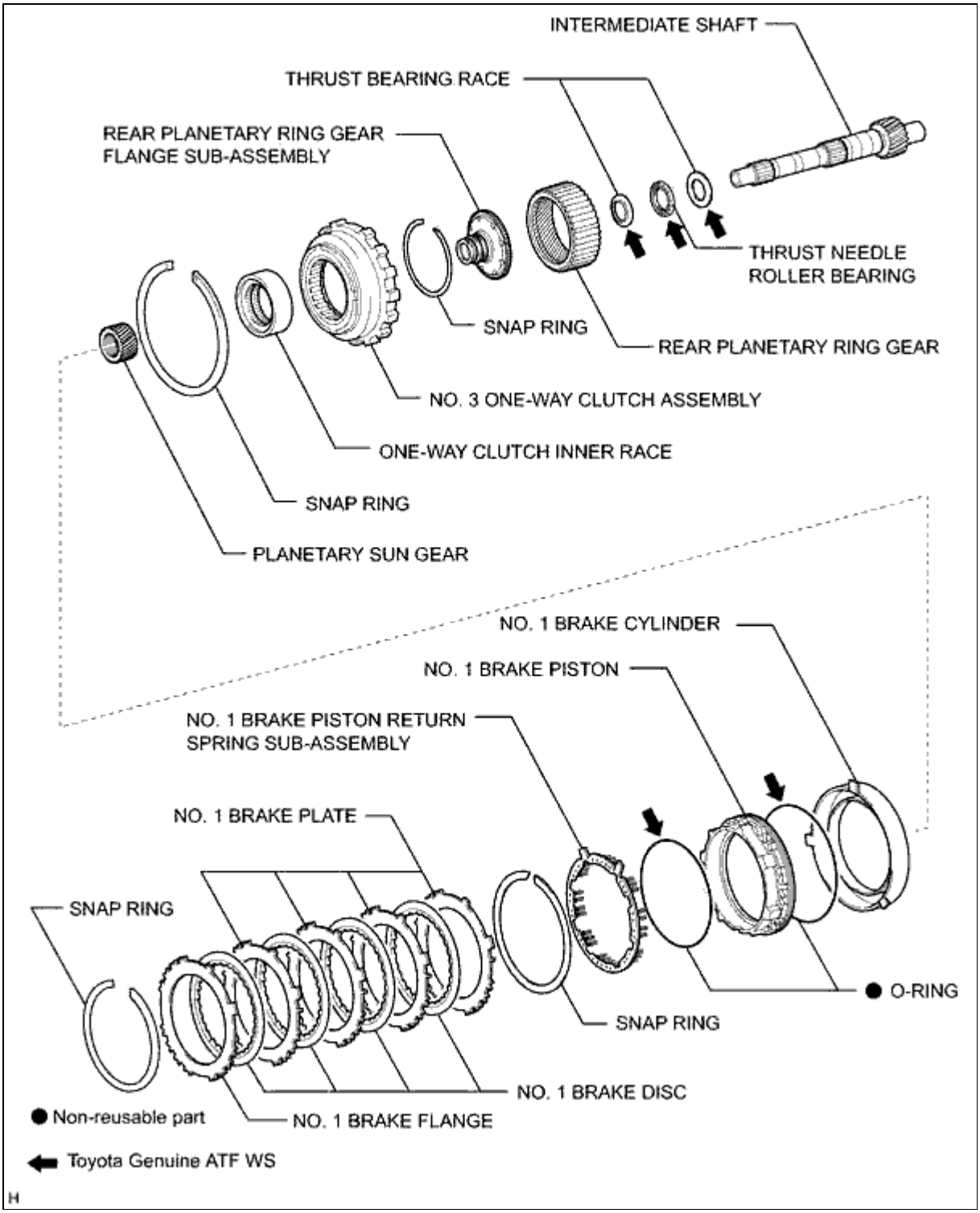
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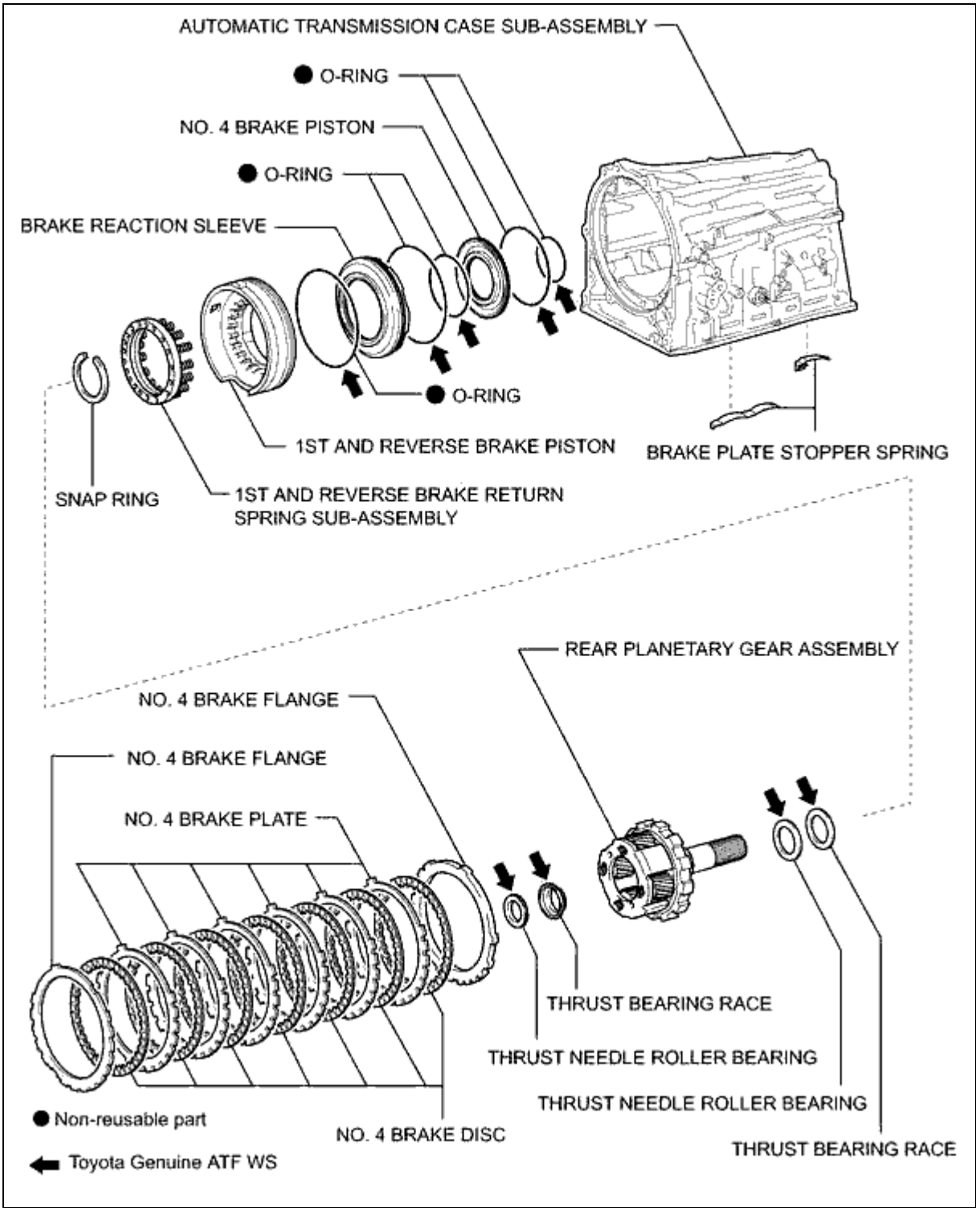
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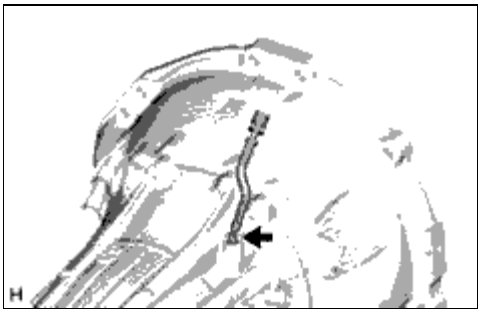
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9Z04XX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. REMOVE BREATHER PLUG HOSE

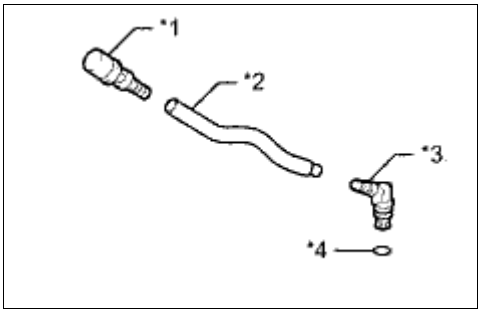
(a) Remove the breather plug hose from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the breather plug.

Text in Illustration

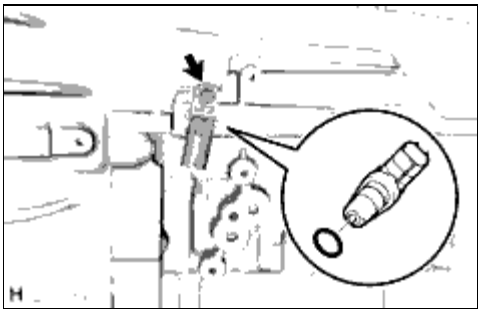
*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring



(c) Remove the breather plug sub-assembly and breather plug from the breather plug hose.

2. REMOVE TRANSMISSION REVOLUTION SENSOR

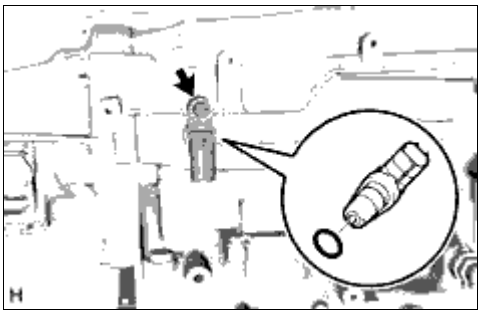
(a) Remove the bolt and transmission revolution sensor (NT) from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the transmission revolution sensor (NT).

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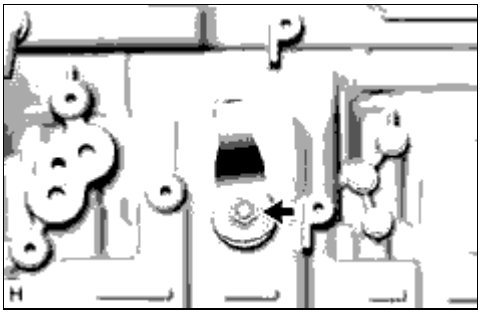
(c) Remove the bolt and transmission revolution sensor (SP2) from the automatic transmission case sub-assembly.



(d) Remove the O-ring from the transmission revolution sensor (SP2).

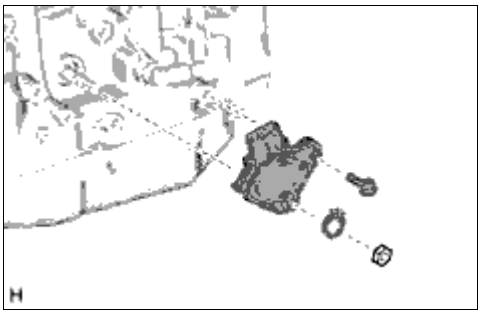
3. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH

(a) Remove the nut, spring washer and transmission control shaft lever LH from the manual valve lever shaft.



4. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Using a screwdriver, bend the tabs of the lock washer.



(b) Remove the nut and the lock washer.

(c) Remove the bolt and park/neutral position switch from the automatic transmission case sub-assembly.

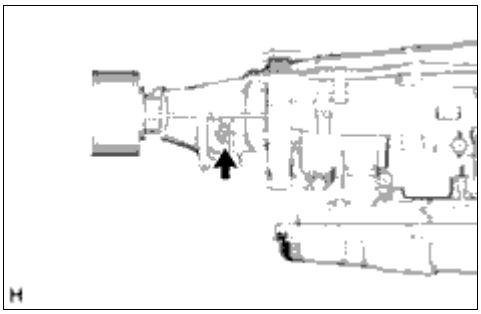
HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

5. REMOVE REFILL PLUG

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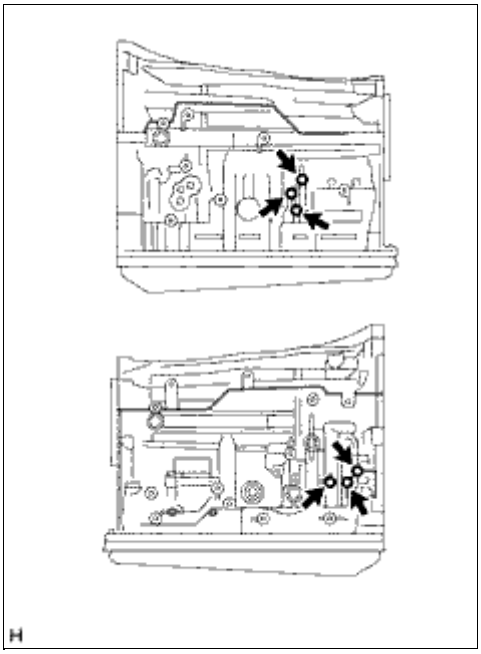
(a) Remove the refill plug from the extension housing sub-assembly.



(b) Remove the O-ring from the refill plug.

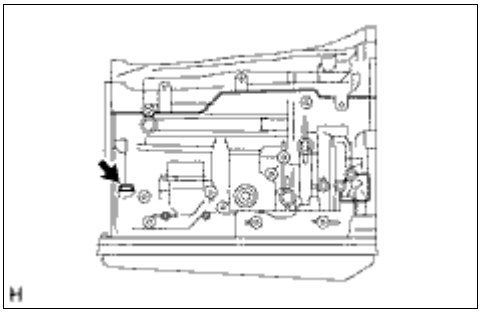
6. REMOVE AUTOMATIC TRANSMISSION CASE PLUG

(a) Remove the 6 automatic transmission case plugs from the automatic transmission case sub-assembly.



(b) Remove the 6 O-rings from the 6 automatic transmission case plugs.

(c) Using a T55 "TORX" socket wrench, remove the automatic transmission case plug from the automatic transmission case sub-assembly.

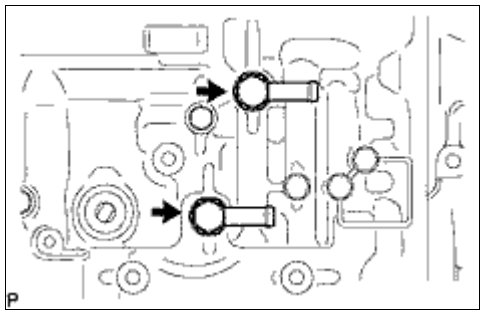


(d) Remove the O-ring from the automatic transmission case plug.

7. REMOVE OIL COOLER TUBE UNION

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(a) Remove the 2 oil cooler tube unions from the automatic transmission case sub-assembly.



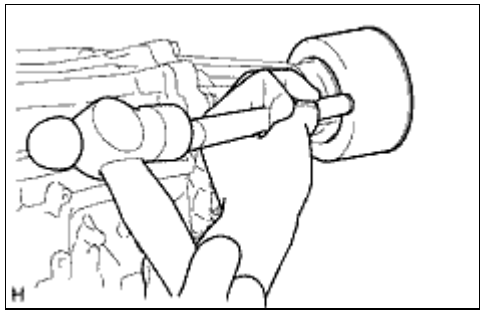
(b) Remove the 2 O-rings from the 2 oil cooler tube unions.

8. REMOVE EXTENSION HOUSING DUST DEFLECTOR

(a) Using a brass bar and hammer, tap out the extension housing dust deflector from the extension housing sub-assembly.

NOTICE:

Be careful not to damage the extension housing sub-assembly.

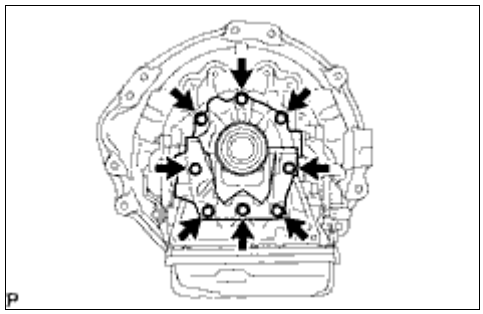


9. REMOVE EXTENSION HOUSING SUB-ASSEMBLY

(a) Remove the 8 bolts and extension housing sub-assembly from the automatic transmission case sub-assembly.

HINT:

Use a brass bar and hammer to remove the extension housing sub-assembly.

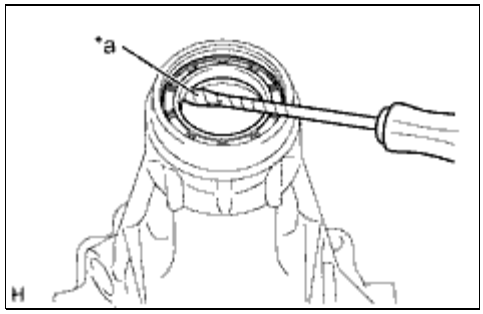


10. REMOVE AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

(a) Using a screwdriver, pry out the automatic transmission extension housing oil seal from the extension housing sub-assembly.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the extension housing sub-assembly.

HINT:

Tape the screwdriver tip before use.

11. REMOVE AUTOMATIC TRANSMISSION HOUSING

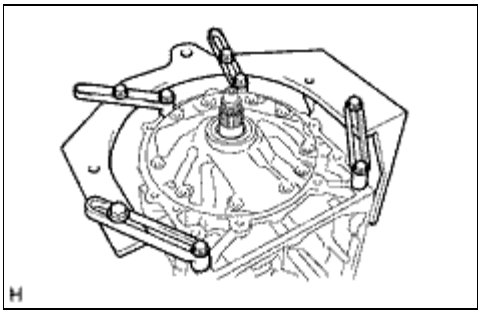
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(a) Remove the 12 bolts and automatic transmission housing from the automatic transmission case sub-assembly.



12. SECURE AUTOMATIC TRANSMISSION CASE SUB-ASSEMBLY

(a) Install the automatic transmission case sub-assembly to an overhaul attachment.



13. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

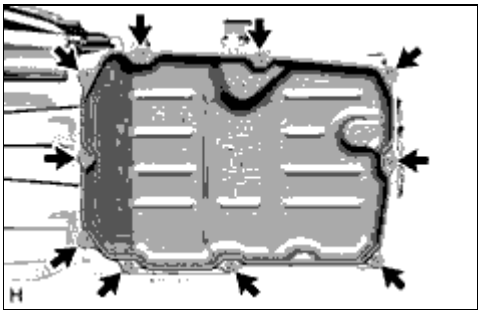
NOTICE:

Do not turn the transmission over as this will contaminate the transmission valve body assembly with foreign matter located at the bottom of the automatic transmission oil pan sub-assembly.

(a) Using a 5 mm socket hexagon wrench, remove the overflow plug and gasket.

(b) Remove the drain plug and gasket.

(c) Remove the 10 bolts, automatic transmission oil pan sub-assembly and automatic transmission oil pan gasket.



(d) Remove the 4 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

(e) Examine the particles in the automatic transmission oil pan sub-assembly.

(1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.

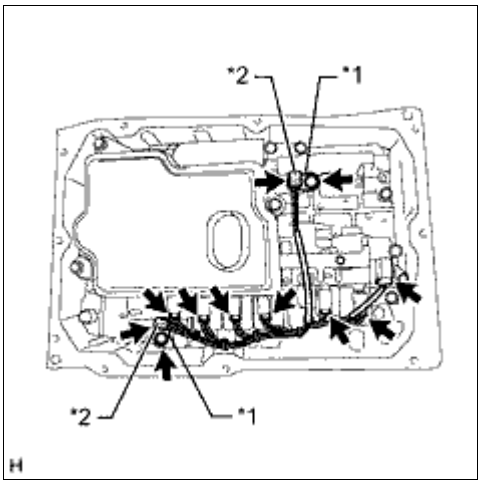
Steel (magnetic): bearing, gear and clutch plate wear

Brass (non-magnetic): bush wear

14. REMOVE TRANSMISSION WIRE

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(a) Remove the 2 bolts and 2 temperature sensor clamps, and disconnect the 2 temperature sensors.

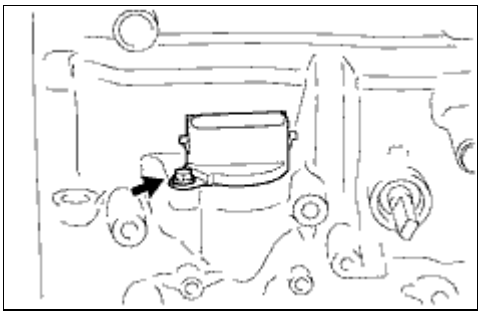


Text in Illustration

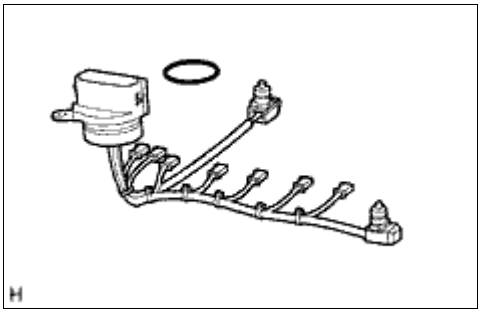
*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Disconnect the 7 solenoid valve connectors and transmission wire from the transmission valve body assembly.

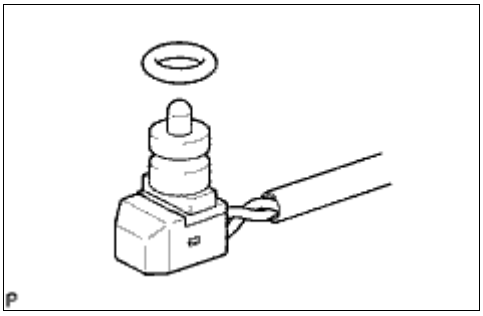
(c) Remove the bolt and pull out the transmission wire from the automatic transmission case sub-assembly.



(d) Remove the O-ring from the connector of transmission wire.



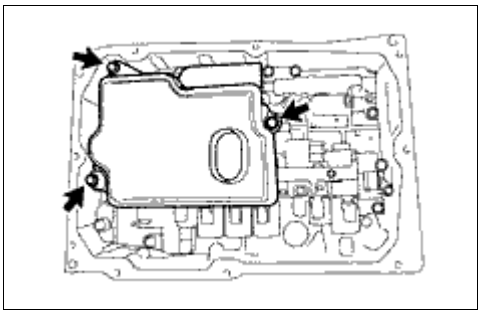
(e) Remove the 2 O-rings from the 2 temperature sensors.



15. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

cardiagn.com

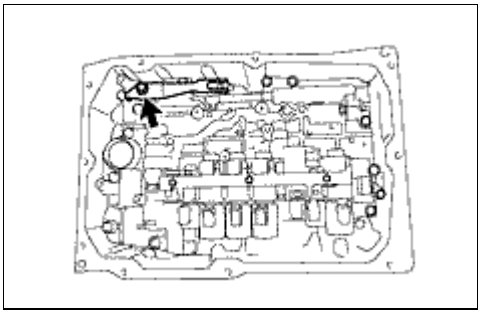
(a) Remove the 3 bolts and valve body oil strainer assembly from the transmission valve body assembly.



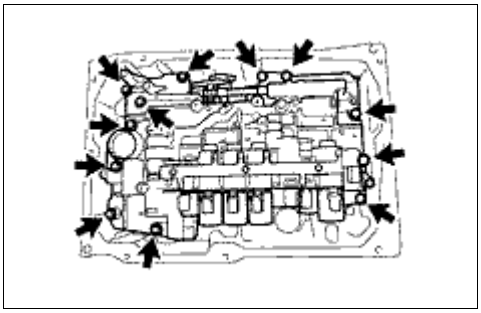
(b) Remove the O-ring from the valve body oil strainer assembly.

16. REMOVE TRANSMISSION VALVE BODY ASSEMBLY

(a) Remove the bolt, detent spring cover and detent spring from the transmission valve body assembly.

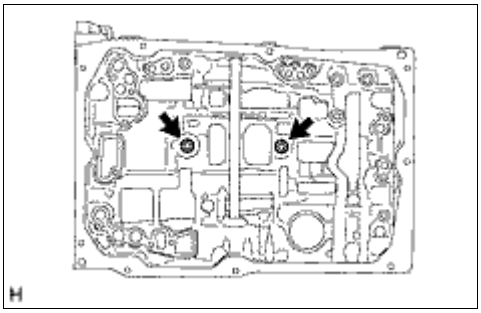


(b) Remove the 12 bolts and transmission valve body assembly from the automatic transmission case sub-assembly.



17. REMOVE TRANSMISSION CASE GASKET

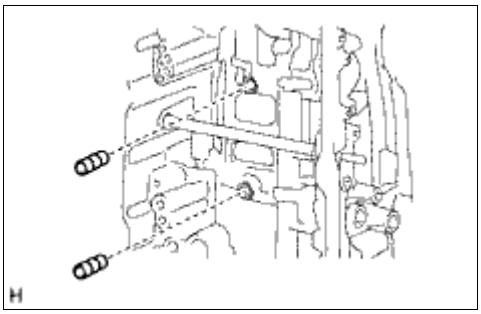
(a) Remove the 2 transmission case gaskets from the automatic transmission case sub-assembly.



18. REMOVE BRAKE DRUM GASKET

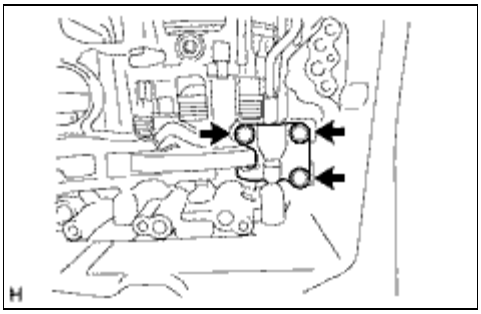
cardiagn.com

(a) Remove the 2 brake drum gaskets from the automatic transmission case sub-assembly.



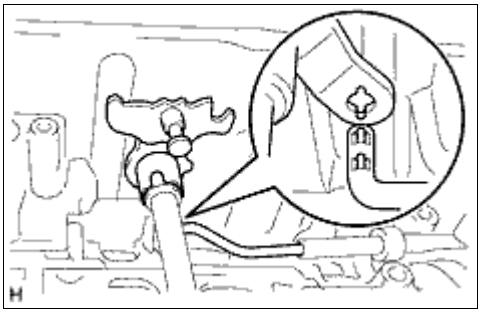
19. REMOVE PARKING LOCK PAWL BRACKET

(a) Remove the 3 bolts and parking lock pawl bracket from the automatic transmission case sub-assembly.



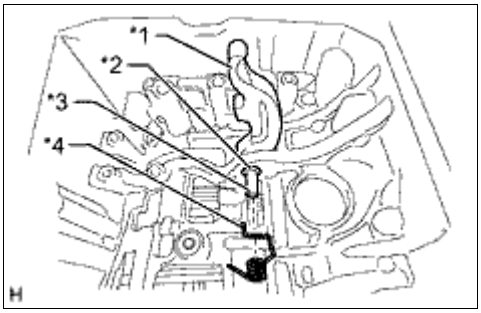
20. REMOVE PARKING LOCK ROD SUB-ASSEMBLY

(a) Remove the parking lock rod sub-assembly from the manual valve lever sub-assembly.



21. REMOVE PARKING LOCK PAWL SHAFT

(a) Pull out the parking lock pawl shaft from the front side, and remove the parking lock pawl and spring.



Text in Illustration

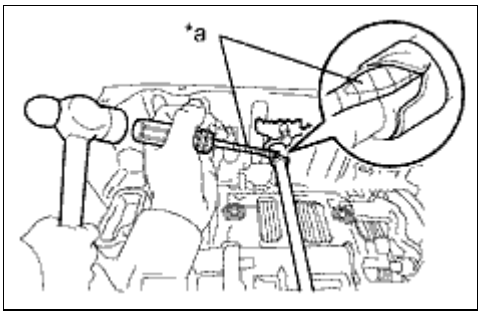
*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring

(b) Remove the E-ring from the parking lock pawl shaft.

22. REMOVE MANUAL VALVE LEVER SUB-ASSEMBLY

cardiagn.com

(a) Using a screwdriver and hammer, cut off the spacer and remove it from the manual valve lever shaft.



Text in Illustration

*a	Protective Tape

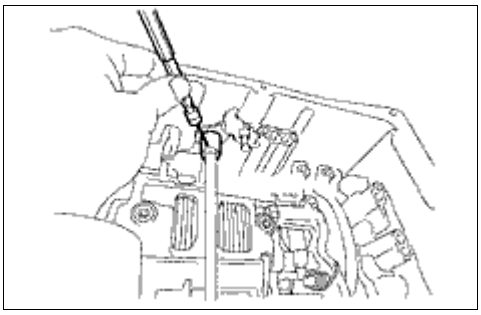
NOTICE:

Be careful not to damage the manual valve lever shaft.

HINT:

Tape the screwdriver tip before use.

(b) Using a 3 mm pin punch and hammer, drive out the spring pin.



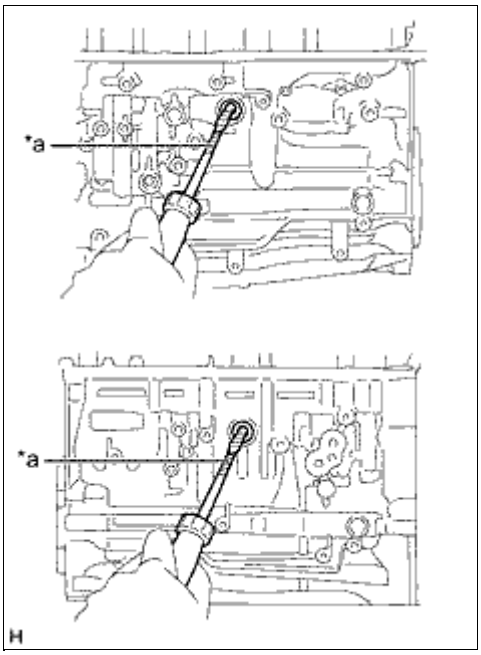
HINT:

Slowly drive out the spring pin so that it does not fall into the automatic transmission case sub-assembly.

(c) Pull the manual valve lever shaft out through the case and remove the manual valve lever sub-assembly.

23. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Using a screwdriver, pry out the 2 manual valve lever shaft oil seals from the automatic transmission case sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

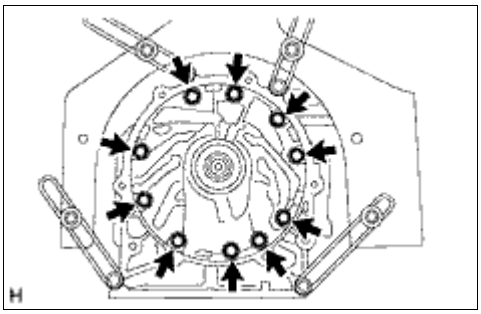
HINT:

Tape the screwdriver tip before use.

24. REMOVE OIL PUMP ASSEMBLY

cardiagn.com

(a) Remove the 10 bolts.

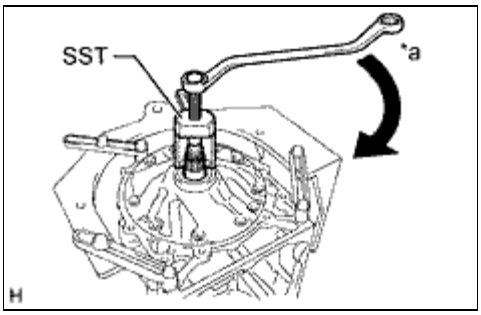


(b) Using SST, pull out the oil pump assembly from the automatic transmission case sub-assembly.

Text in Illustration

*a	Turn

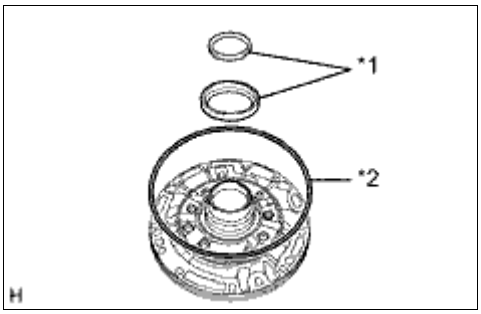
SST: 09610-20012



(c) Remove the 2 thrust bearing races from the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race
*2	Oil Pump O-ring



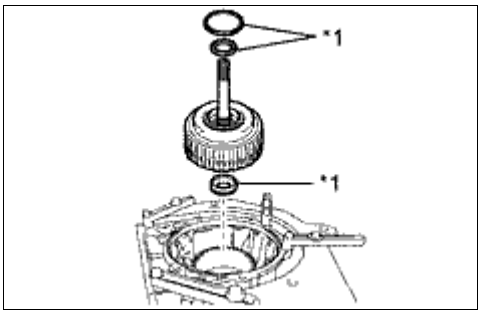
(d) Remove the oil pump O-ring from the oil pump assembly.

25. REMOVE CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

(a) Remove the clutch drum and input shaft assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing

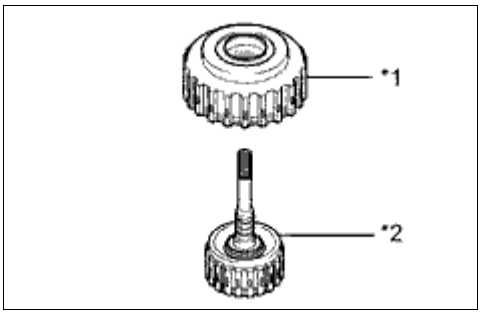


(b) Remove the 3 thrust needle roller bearings from the clutch drum and input shaft assembly.

26. REMOVE DIRECT CLUTCH DRUM SUB-ASSEMBLY

cardiagn.com

(a) Remove the direct clutch drum sub-assembly from the input shaft sub-assembly.



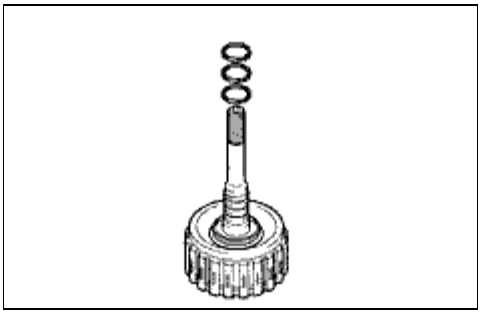
Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly

27. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH) INFO

28. REMOVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 3 clutch drum oil seal rings from the input shaft sub-assembly.



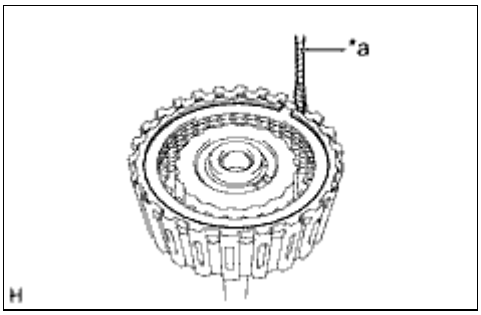
29. REMOVE NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Secure the input shaft sub-assembly in a vise between aluminum plates.

NOTICE:

Do not overtighten the vise.

(b) Using a screwdriver, remove the snap ring.



Text in Illustration

*a	Protective Tape

NOTICE:

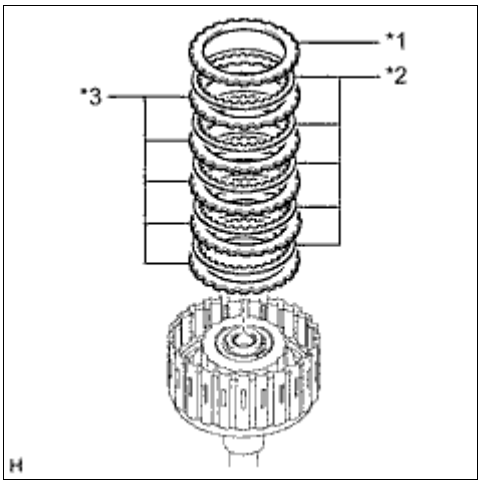
Be careful not to damage the input shaft sub-assembly.

HINT:

Tape the screwdriver tip before use.

cardiagn.com

(c) Remove the forward clutch flange, 5 No. 1 clutch discs and 5 No. 1 clutch plates from the input shaft sub-assembly.



Text in Illustration

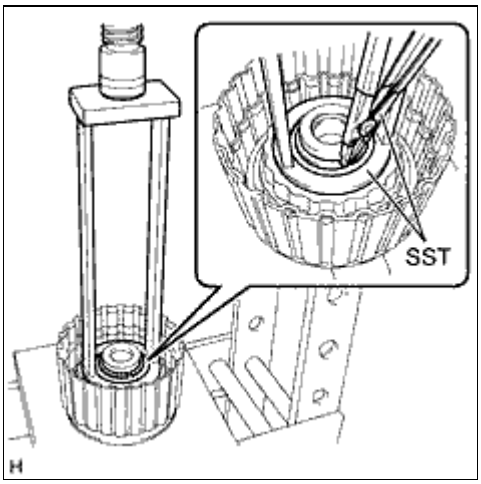
*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

30. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC) INFO

31. REMOVE NO. 1 CLUTCH BALANCER

(a) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110

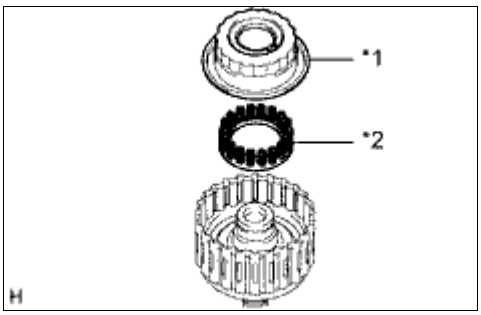


(b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070

(c) Remove the No. 1 clutch balancer and forward clutch return spring sub-assembly from the input shaft sub-assembly.



Text in Illustration

*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

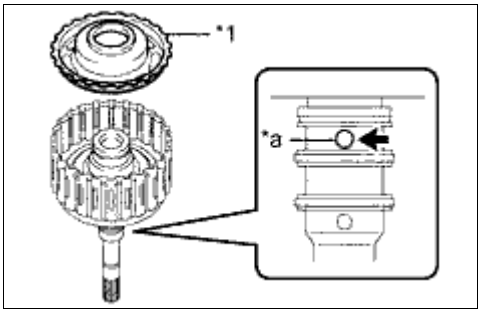
(d) Remove the O-ring from the No. 1 clutch balancer.

32. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

33. REMOVE FORWARD CLUTCH PISTON

cardiagn.com

(a) While holding the forward clutch piston, apply compressed air to the oil hole of the input shaft sub-assembly to remove the forward clutch piston from the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Piston
*a	Oil Hole

(b) Remove the O-ring from the forward clutch piston.

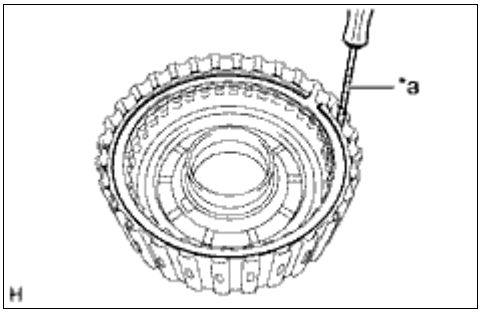
(c) Remove the O-ring from the input shaft sub-assembly.

34. INSPECT INPUT SHAFT SUB-ASSEMBLY INFO

35. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

36. REMOVE NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Using a screwdriver, remove the snap ring from the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

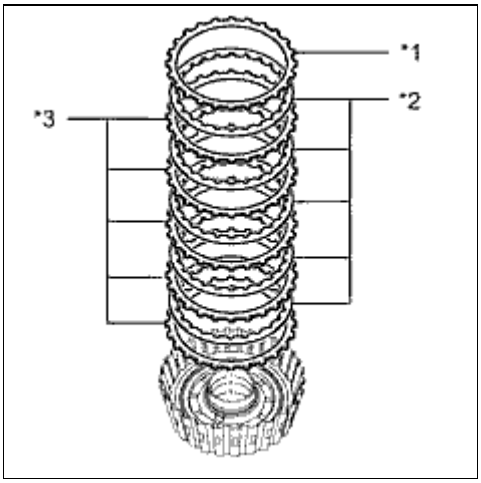
NOTICE:

Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

(b) Remove the direct clutch flange, 5 No. 2 clutch discs and 5 No. 2 clutch plates from the direct clutch drum sub-assembly.



Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

37. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC) INFO

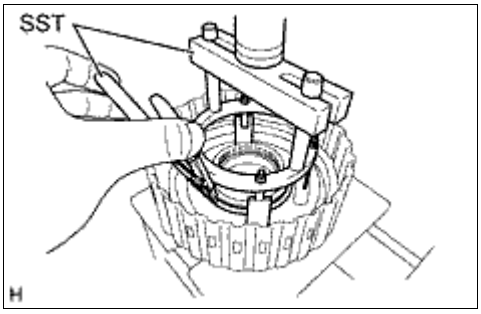
38. REMOVE NO. 2 CLUTCH BALANCER

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(a) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110



(b) Using SST, remove the snap ring.

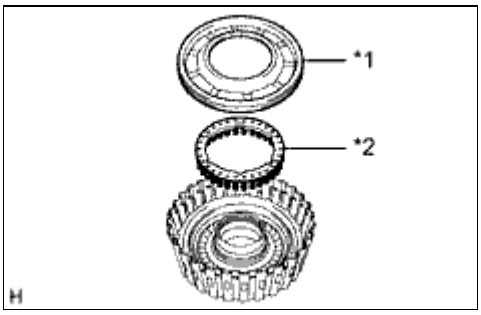
SST: 09350-30020

09350-07070

(c) Remove the No. 2 clutch balancer and direct clutch return spring sub-assembly from the direct clutch drum sub-assembly.

Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly



(d) Remove the O-ring from the No. 2 clutch balancer.

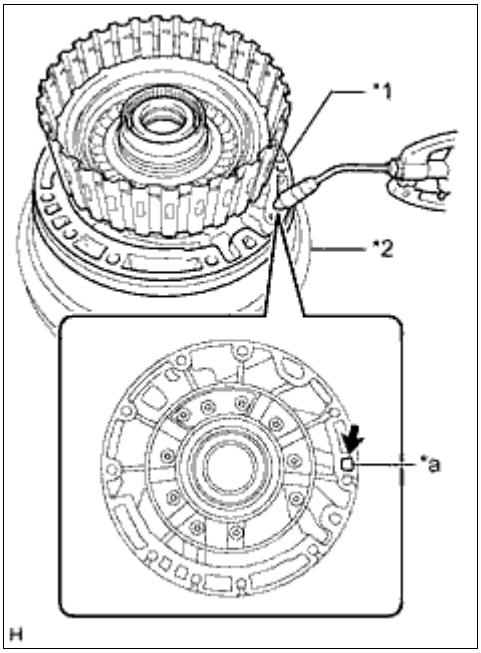
39. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

40. REMOVE DIRECT CLUTCH PISTON

(a) Place the oil pump assembly onto the torque converter assembly, and then place the direct clutch drum sub-assembly onto the oil pump assembly.

Text in Illustration

*1	Oil Pump Assembly
*2	Torque Converter Assembly
*a	Oil Hole



(b) While holding the direct clutch piston, apply compressed air to the oil hole of the oil pump assembly to remove the direct clutch piston from the direct clutch drum sub-assembly.

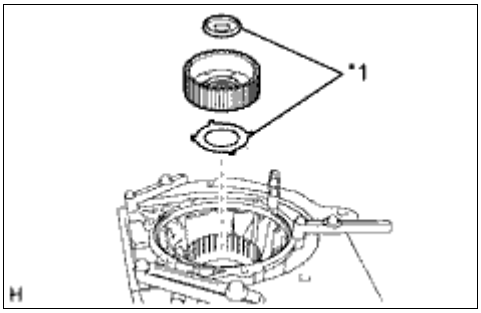
(c) Remove the 2 O-rings from the direct clutch piston.

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41. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY INFO

42. REMOVE MULTIPLE DISC CLUTCH HUB

(a) Remove the multiple disc clutch hub from the automatic transmission case sub-assembly.



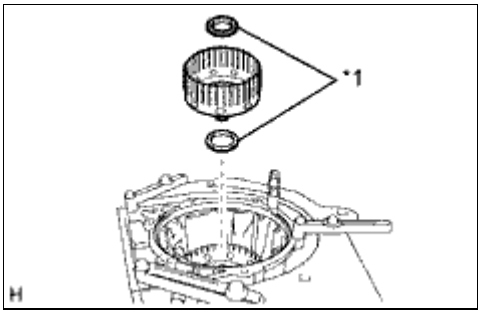
Text in Illustration

*1	Thrust Bearing Race

(b) Remove the 2 thrust bearing races from the multiple disc clutch hub.

43. REMOVE FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Remove the forward clutch hub sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

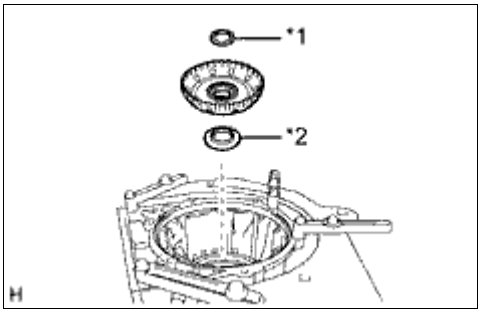
*1	Thrust Needle Roller Bearing

(b) Remove the 2 thrust needle roller bearings from the forward clutch hub sub-assembly.

44. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY INFO

45. REMOVE SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Remove the sun gear input drum sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

*1	Thrust Bearing Race
*2	Thrust Needle Roller Bearing

(b) Remove the thrust needle roller bearing and thrust bearing race from the sun gear input drum sub-assembly.

46. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY INFO

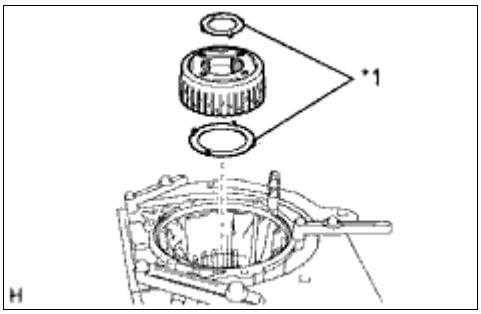
47. REMOVE FRONT PLANETARY GEAR ASSEMBLY

cardiagn.com

(a) Remove the front planetary gear assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race



(b) Remove the 2 thrust bearing races from the front planetary gear assembly.

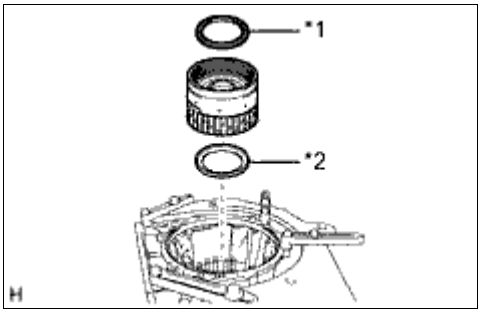
48. INSPECT FRONT PLANETARY GEAR ASSEMBLY INFO

49. REMOVE FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Remove the front planetary ring gear with front planetary ring gear flange sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race



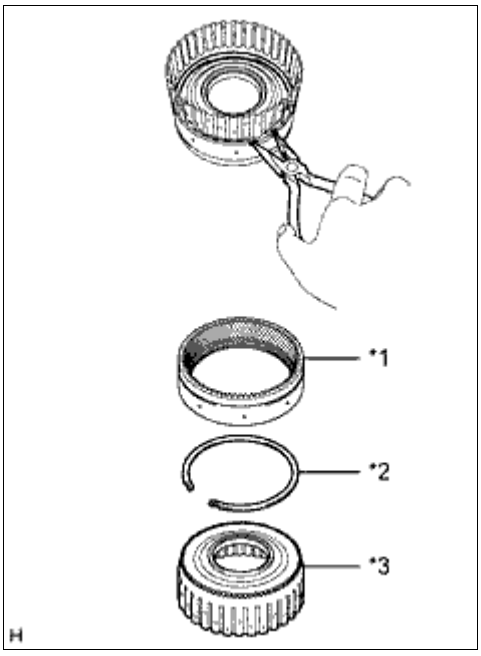
(b) Remove the thrust needle roller bearing and thrust bearing race from the front planetary ring gear with front planetary ring gear flange sub-assembly.

50. REMOVE FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using needle-nose pliers, remove the snap ring and front planetary ring gear flange sub-assembly from the front planetary ring gear.

Text in Illustration

*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly



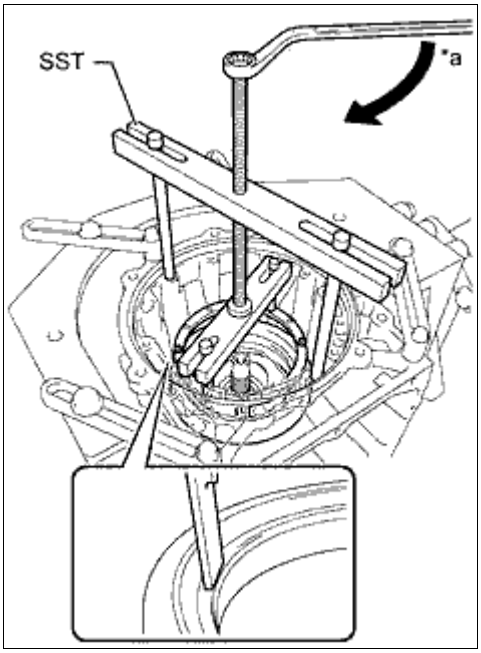
51. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

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52. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

53. REMOVE NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06020
09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

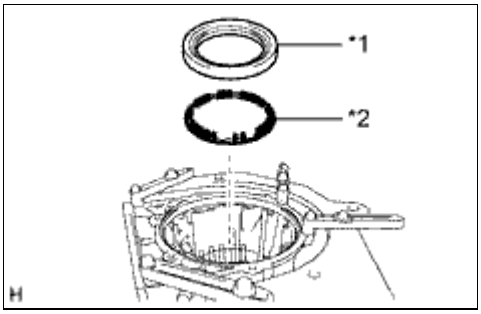
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(c) Remove the No. 2 brake cylinder with No. 2 brake piston and No. 2 brake piston return spring sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

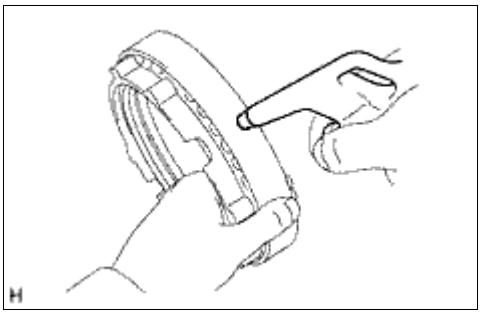
*1	No. 2 Brake Cylinder with No. 2 Brake Piston
*2	No. 2 Brake Piston Return Spring Sub-assembly

54. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

55. REMOVE NO. 2 BRAKE PISTON

cardiagn.com

(a) While holding the No. 2 brake piston, apply compressed air to the oil hole of the No. 2 brake cylinder to remove the No. 2 brake piston from the No. 2 brake cylinder.



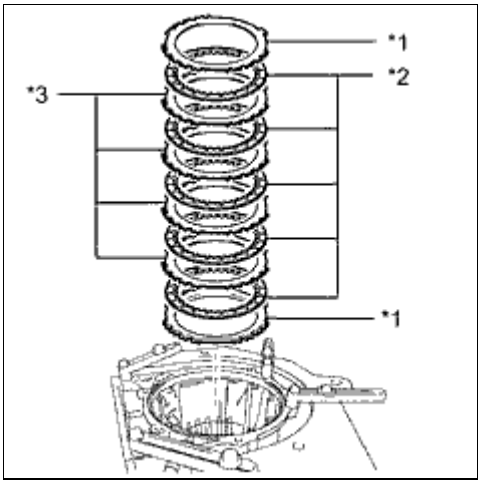
(b) Remove the 2 O-rings from the No. 2 brake piston.

56. REMOVE NO. 2 BRAKE DISC

(a) Remove the 2 No. 2 brake flanges, 5 No. 2 brake discs and 4 No. 2 brake plates from the automatic transmission case sub-assembly.

Text in Illustration

*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate



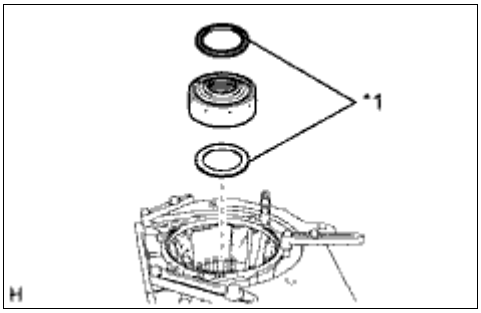
57. INSPECT NO. 2 BRAKE DISC INFO

58. REMOVE CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

(a) Remove the center planetary ring gear flange with center planetary ring gear from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing



(b) Remove the 2 thrust needle roller bearings from the center planetary ring gear flange with center planetary ring gear.

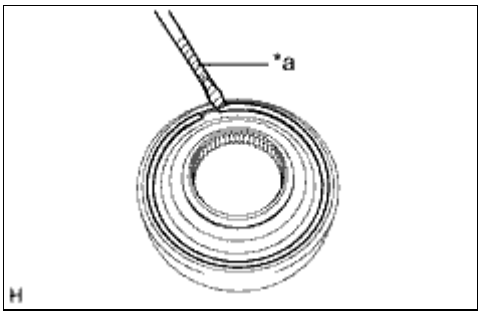
59. REMOVE CENTER PLANETARY RING GEAR

cardiagn.com

(a) Using a screwdriver, remove the snap ring from the center planetary ring gear flange with center planetary ring gear.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

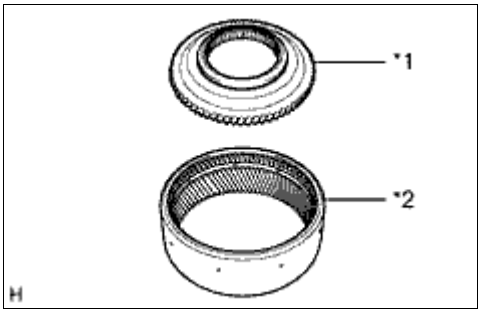
HINT:

Tape the screwdriver tip before use.

(b) Remove the center planetary ring gear from the center planetary ring gear flange.

Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

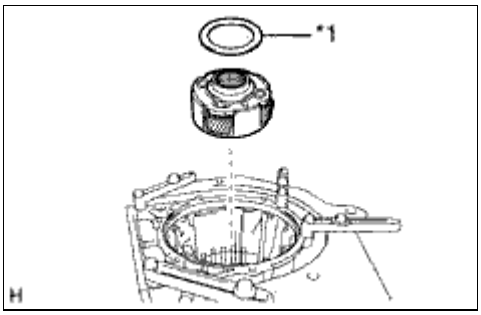


60. REMOVE CENTER PLANETARY GEAR ASSEMBLY

(a) Remove the center planetary gear assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race

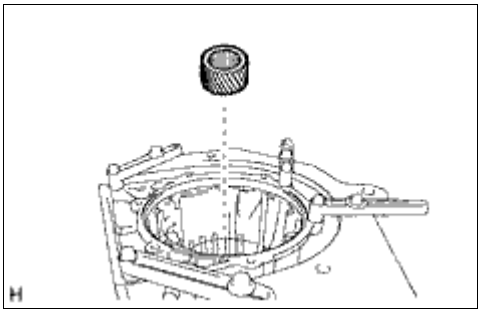


(b) Remove the thrust bearing race from the center planetary gear assembly.

61. INSPECT CENTER PLANETARY GEAR ASSEMBLY INFO

62. REMOVE PLANETARY SUN GEAR

(a) Remove the planetary sun gear from the automatic transmission case sub-assembly.

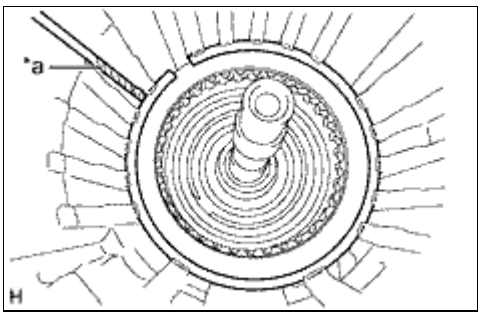


63. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

cardiagn.com

64. REMOVE NO. 1 BRAKE DISC

(a) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.



Text in Illustration

*a	Protective Tape

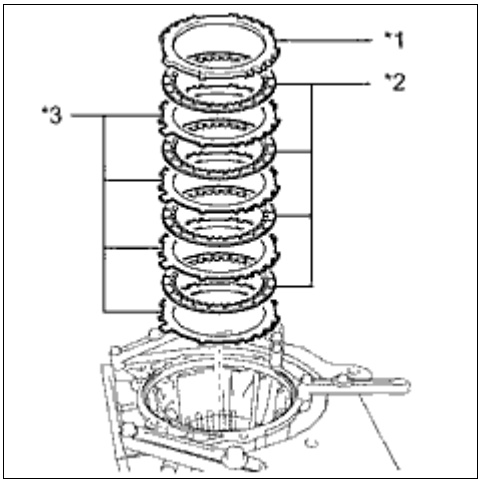
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(b) Remove the No. 1 brake flange, 4 No. 1 brake discs and 4 No. 1 brake plates from the automatic transmission case sub-assembly.



Text in Illustration

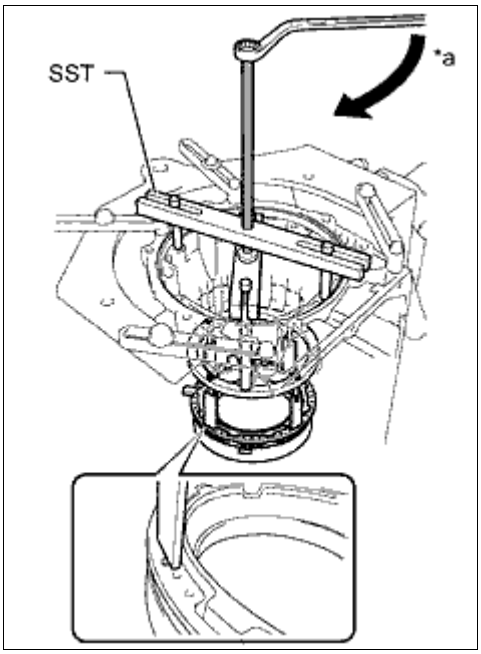
*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

65. INSPECT NO. 1 BRAKE DISC INFO

66. REMOVE NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

cardiagn.com

(a) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06040
09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

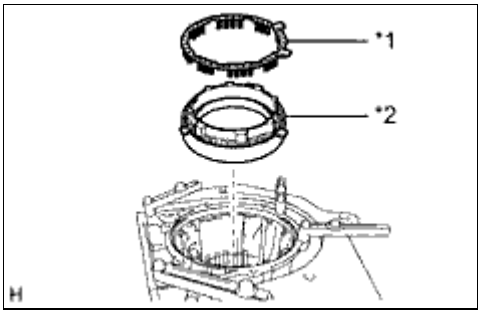
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(c) Remove the No. 1 brake piston return spring sub-assembly and No. 1 brake cylinder with No. 1 brake piston from the automatic transmission case sub-assembly.



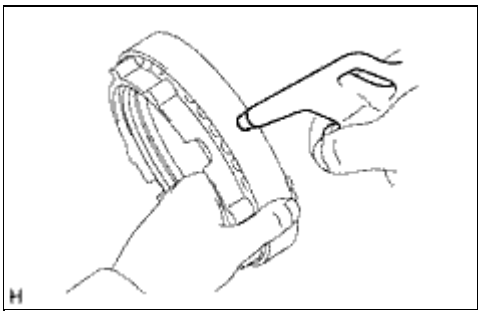
Text in Illustration

*1	No. 1 Brake Piston Return Spring Sub-assembly
*2	No. 1 Brake Cylinder with No. 1 Brake Piston

67. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

68. REMOVE NO. 1 BRAKE PISTON

(a) While holding the No. 1 brake piston, apply compressed air to the oil hole of the No. 1 brake cylinder to remove the No. 1 brake piston from the No. 1 brake cylinder.



(b) Remove the 2 O-rings from the No. 1 brake piston.

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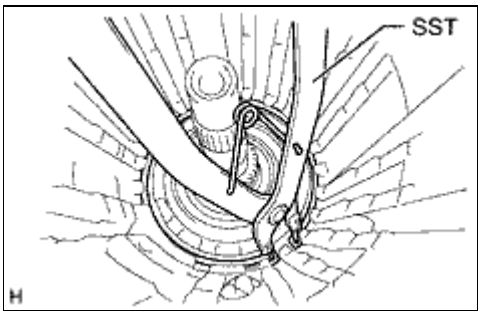
69. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

70. REMOVE INTERMEDIATE SHAFT WITH NO. 3 ONE-WAY CLUTCH ASSEMBLY AND REAR PLANETARY RING GEAR

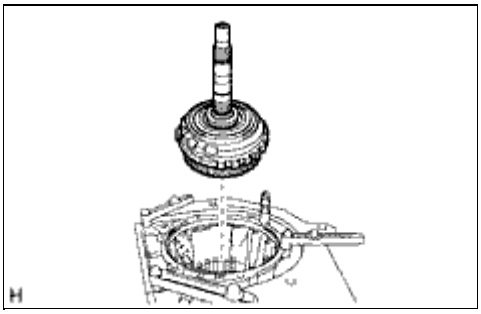
(a) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07060



(b) Remove the intermediate shaft with No. 3 one-way clutch assembly and rear planetary ring gear from the automatic transmission case sub-assembly.



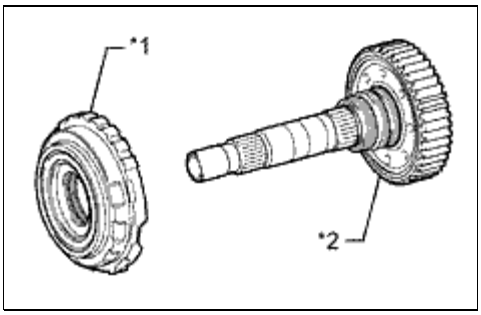
71. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY INFO

72. REMOVE NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Remove the No. 3 one-way clutch assembly with one-way clutch inner race from the intermediate shaft with rear planetary ring gear.

Text in Illustration

*1	No. 3 One-way Clutch Assembly with One-way Clutch Inner Race
*2	Intermediate Shaft with Rear Planetary Ring Gear

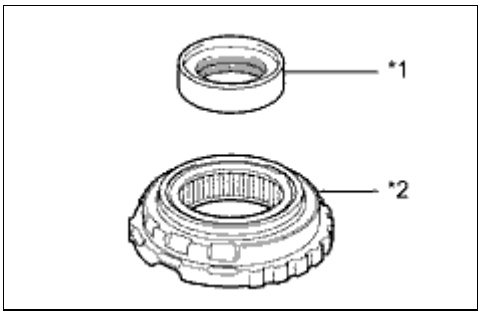


73. REMOVE ONE-WAY CLUTCH INNER RACE

(a) Remove the one-way clutch inner race from the No. 3 one-way clutch assembly.

Text in Illustration

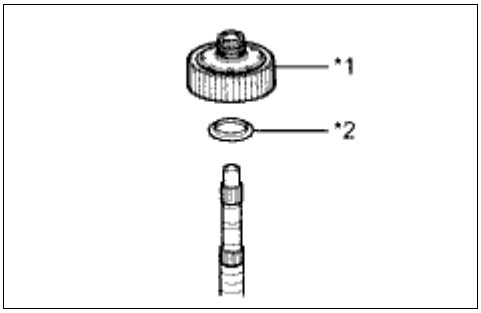
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly



74. REMOVE REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

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(a) Remove the rear planetary ring gear flange sub-assembly with rear planetary ring gear from the intermediate shaft.

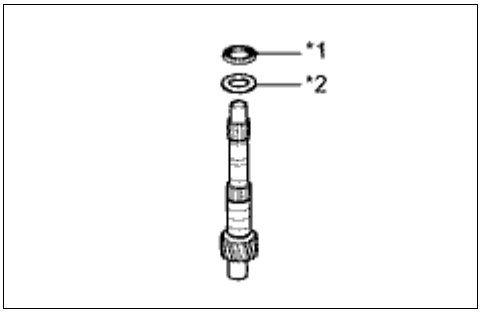


Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly with Rear Planetary Ring Gear
*2	Thrust Bearing Race

(b) Remove the thrust bearing race from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

(c) Remove the thrust needle roller bearing and thrust bearing race from the intermediate shaft.



Text in Illustration

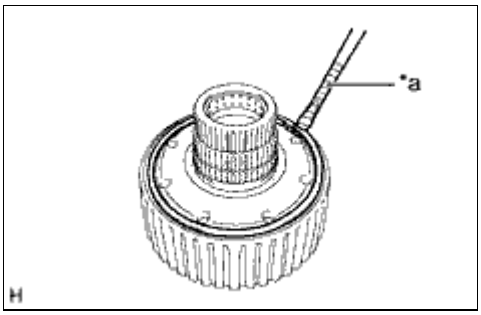
*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race

75. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

76. INSPECT INTERMEDIATE SHAFT INFO

77. REMOVE REAR PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

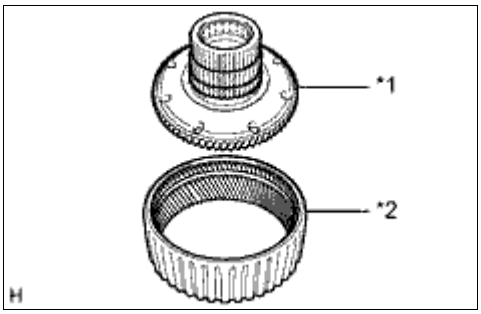
Tape the screwdriver tip before use.

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(b) Remove the rear planetary ring gear from the rear planetary ring gear flange sub-assembly.

Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

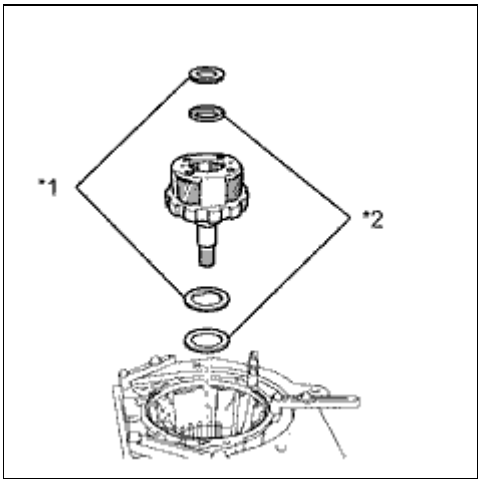


78. REMOVE REAR PLANETARY GEAR ASSEMBLY WITH NO. 4 BRAKE DISC

(a) Remove the rear planetary gear assembly with No. 4 brake disc from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race



(b) Remove the 2 thrust needle roller bearings and thrust bearing race from the rear planetary gear assembly with No. 4 brake disc.

(c) Remove the thrust bearing race from the automatic transmission case sub-assembly.

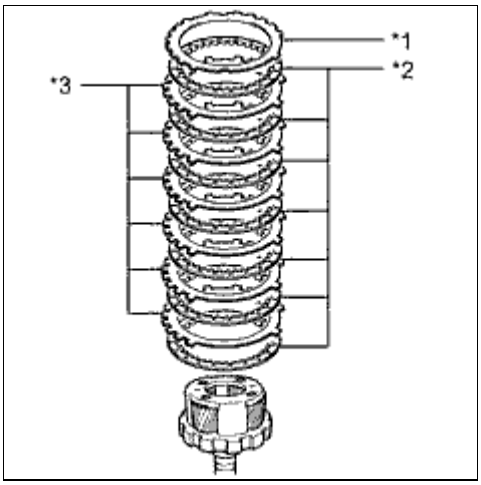
79. INSPECT REAR PLANETARY GEAR ASSEMBLY INFO

80. REMOVE NO. 4 BRAKE DISC

(a) Remove the No. 4 brake flange, 7 No. 4 brake discs and 6 No. 4 brake plates from the rear planetary gear assembly.

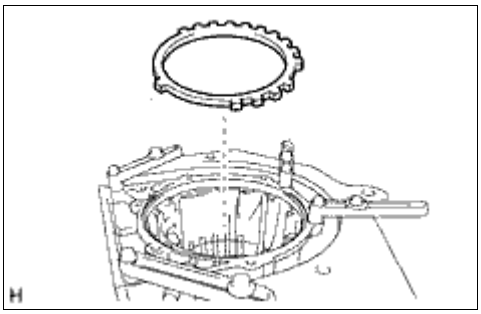
Text in Illustration

*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate



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(b) Remove the No. 4 brake flange from the automatic transmission case sub-assembly.



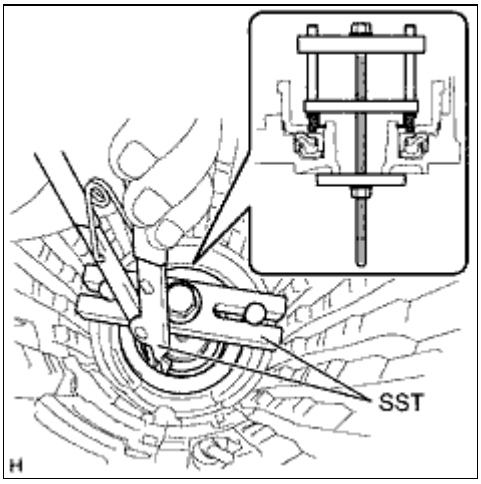
81. INSPECT NO. 4 BRAKE DISC INFO

82. REMOVE 1ST AND REVERSE BRAKE PISTON

(a) Place SST on the 1st and reverse brake return spring sub-assembly and compress the 1st and reverse brake return spring sub-assembly.

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

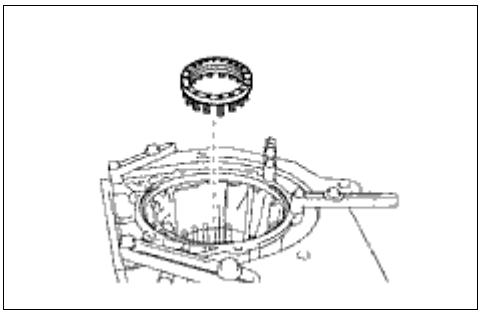


(b) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

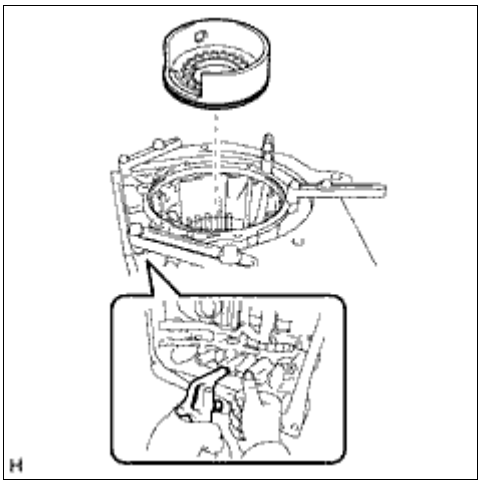
09350-07070

(c) Remove the 1st and reverse brake return spring sub-assembly from the automatic transmission case sub-assembly.



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(d) Apply compressed air to the oil hole of the automatic transmission case sub-assembly to remove the 1st and reverse brake piston from the automatic transmission case sub-assembly.



(e) Remove the O-ring from the 1st and reverse brake piston.

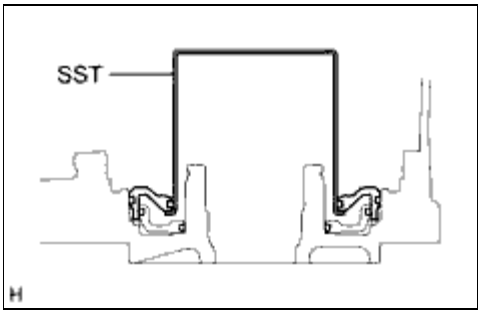
83. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY INFO

84. REMOVE BRAKE REACTION SLEEVE

(a) Using SST, remove the brake reaction sleeve from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07080



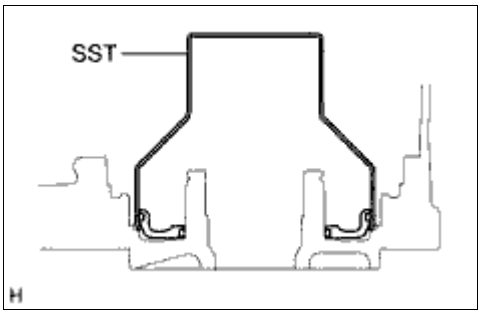
(b) Remove the 2 O-rings from the brake reaction sleeve.

85. REMOVE NO. 4 BRAKE PISTON

(a) Using SST, remove the No. 4 brake piston from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07090

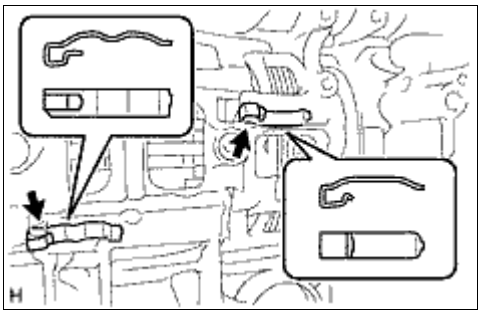


(b) Remove the 2 O-rings from the No. 4 brake piston.

86. REMOVE BRAKE PLATE STOPPER SPRING

cardiagn.com

(a) Remove the 2 brake plate stopper springs from the automatic transmission case sub-assembly.



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000O9W054X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): INSPECTION; 2016 MY Tacoma [08/2015 -]		

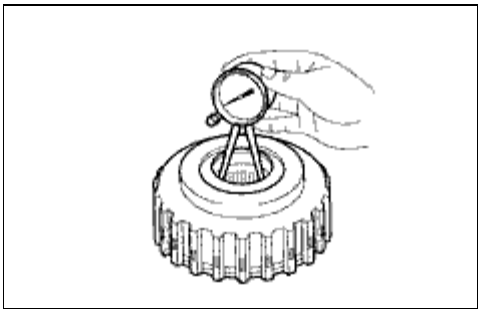
INSPECTION

1. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the direct clutch drum sub-assembly bushing.

Standard inside diameter:
59.515 to 59.540 mm (2.3432 to 2.3440 in.)

If the inside diameter is not as specified, replace the direct clutch drum sub-assembly.

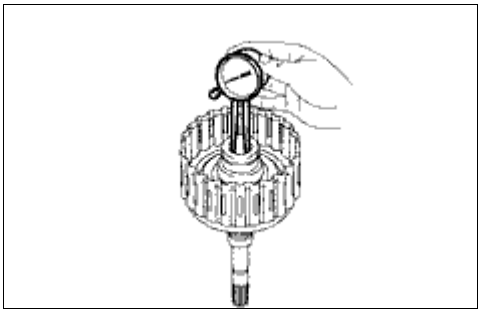


2. INSPECT INPUT SHAFT SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the input shaft sub-assembly bushing.

Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the input shaft sub-assembly.

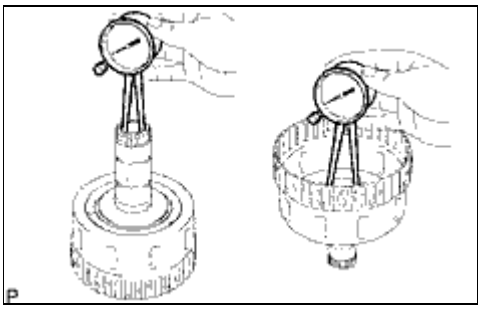


3. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the forward clutch hub sub-assembly bushing.

Standard inside diameter:
26.037 to 26.062 mm (1.0251 to 1.0260 in.)

If the inside diameter is not as specified, replace the forward clutch hub sub-assembly.



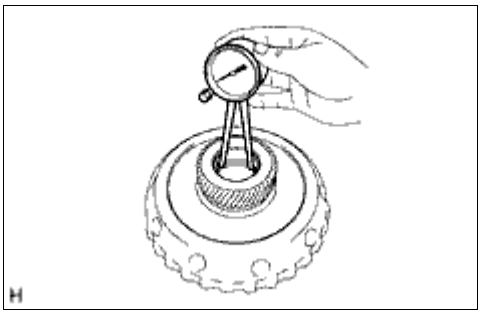
4. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY

cardiagn.com

(a) Using a caliper gauge, measure the inside diameter of the sun gear input drum sub-assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the sun gear input drum sub-assembly.

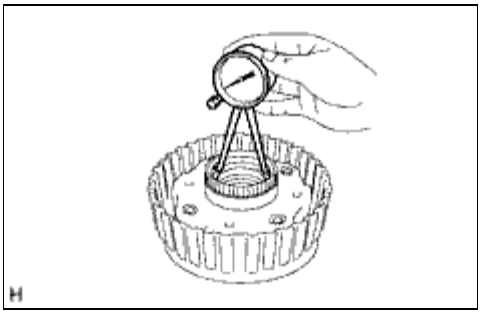


5. INSPECT FRONT PLANETARY GEAR ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary gear assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the front planetary gear assembly.

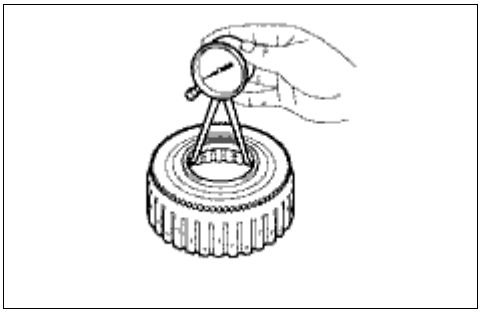


6. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
54.038 to 54.063 mm (2.1275 to 2.1284 in.)

If the inside diameter is not as specified, replace the front planetary ring gear flange sub-assembly.

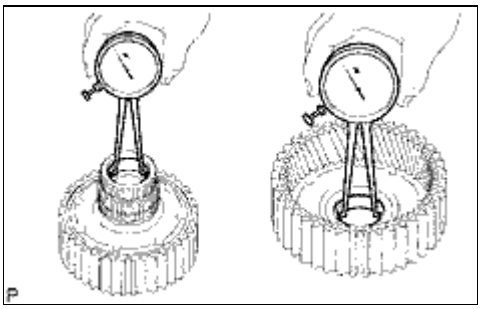


7. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the rear planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
32.176 to 32.201 mm (1.2668 to 1.2677 in.)

If the inside diameter is not as specified, replace the rear planetary ring gear flange sub-assembly.



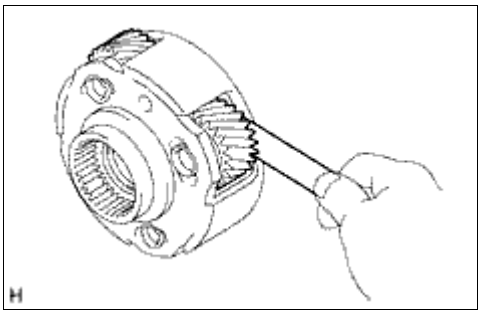
8. INSPECT CENTER PLANETARY GEAR ASSEMBLY

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(a) Using a feeler gauge, measure the center planetary gear pinion thrust clearance.

Standard clearance:
0.12 to 0.68 mm (0.00473 to 0.0267 in.)

If the clearance is not as specified, replace the center planetary gear assembly.

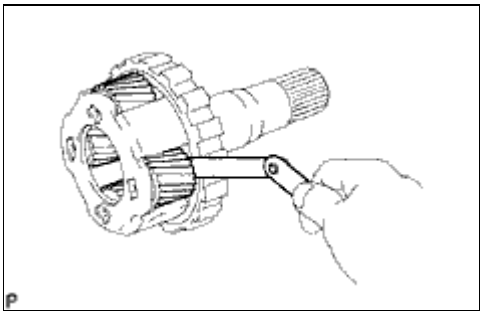


9. INSPECT REAR PLANETARY GEAR ASSEMBLY

(a) Using a feeler gauge, measure the rear planetary gear pinion thrust clearance.

Standard clearance:
0.2 to 0.6 mm (0.00788 to 0.0236 in.)

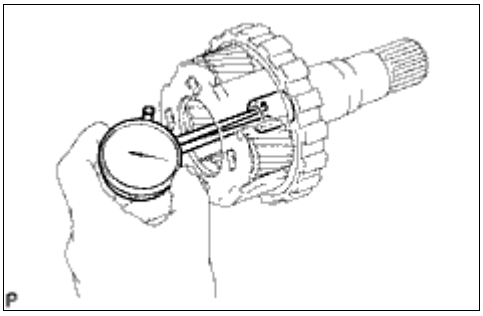
If the clearance is not as specified, replace the rear planetary gear assembly.



(b) Using a caliper gauge, measure the inside diameter of the rear planetary gear bushing.

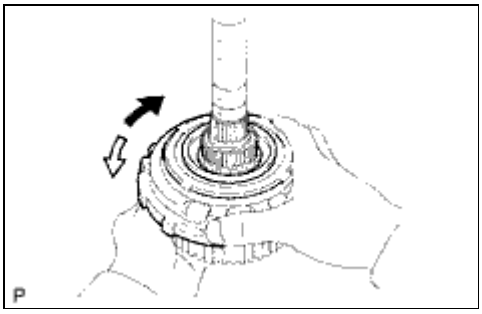
Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the rear planetary gear assembly.



10. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY

(a) Hold the rear planetary ring gear and turn the No. 3 one-way clutch assembly.



Text in Illustration

➡	Lock
⇨	Free

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(b) Check that the No. 3 one-way clutch assembly turns freely when turned counterclockwise and locks when turned clockwise.

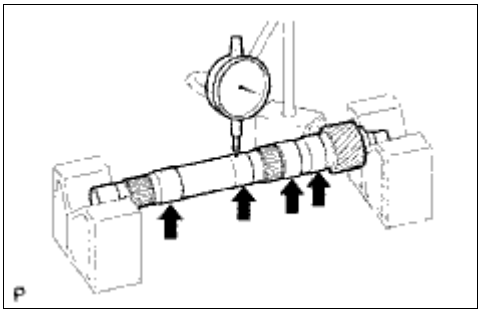
If there is a problem with the No. 3 one-way clutch assembly, replace it.

11. INSPECT INTERMEDIATE SHAFT

(a) Using a dial indicator and V-blocks, check the intermediate shaft runout.

Standard runout:
0.03 mm (0.00118 in.)

If the runout is more than the standard, replace the intermediate shaft with a new one.



(b) Using a micrometer, check the outer diameter of the intermediate shaft at each point shown in the illustration.

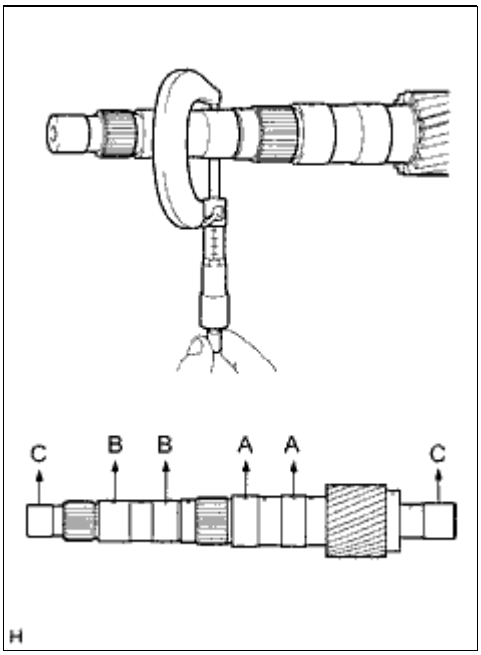
Standard diameter:

A
32.062 to 32.075 mm (1.2623 to 1.2627 in.)

B
25.962 to 25.975 mm (1.0222 to 1.0226 in.)

C
19.963 to 19.976 mm (0.7860 to 0.7864 in.)

If the outer diameter is more than the standard, replace the intermediate shaft with a new one.

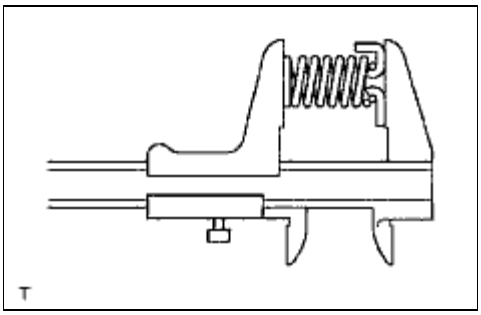


12. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the forward clutch return spring sub-assembly including the spring seat.

Standard free length:
26.74 mm (1.053 in.)

If the free length is more than the standard free length, replace the forward clutch return spring sub-assembly.



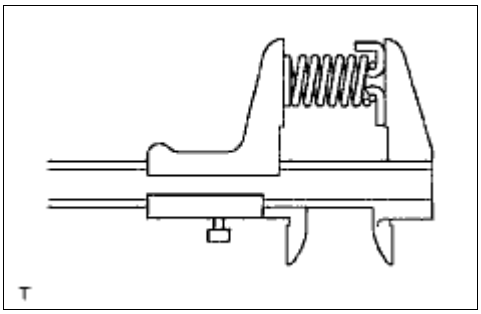
13. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY

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(a) Using a vernier caliper, measure the free length of the direct clutch return spring sub-assembly including the spring seat.

Standard free length:
22.14 mm (0.872 in.)

If the free length is more than the standard free length, replace the direct clutch return spring sub-assembly.

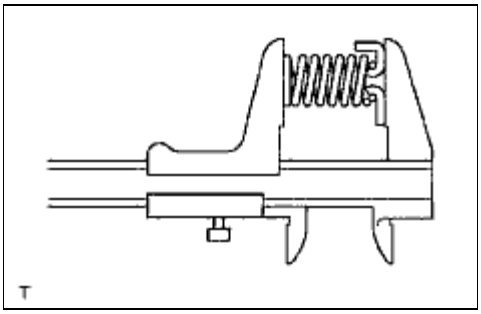


14. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 1 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.72 mm (0.658 in.)

If the free length is more than the standard free length, replace the No. 1 brake piston return spring sub-assembly.

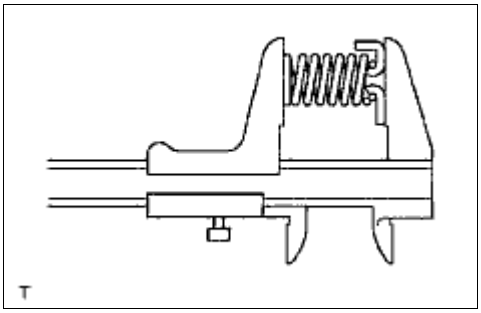


15. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 2 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.68 mm (0.657 in.)

If the free length is more than the standard free length, replace the No. 2 brake piston return spring sub-assembly.

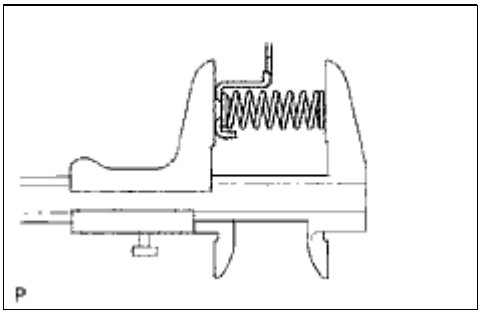


16. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the 1st and reverse brake return spring sub-assembly including the spring seat.

Standard free length:
23.74 mm (0.935 in.)

If the free length is more than the standard free length, replace the 1st and reverse return spring sub-assembly.

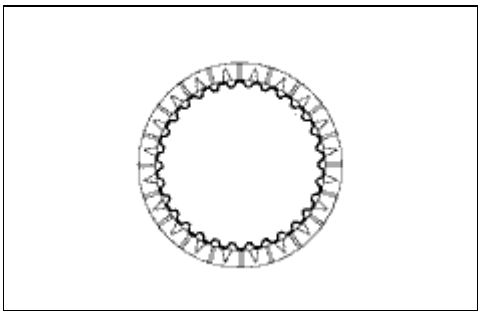


17. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

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(a) Check if the contact surfaces of the No. 1 clutch discs, No. 1 clutch plates and No. 1 clutch flange are worn or burnt.

If necessary, replace them.



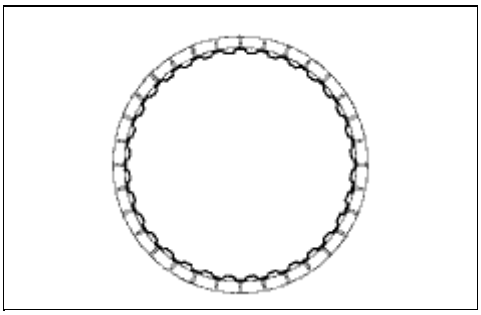
NOTICE:

- If the lining of any No. 1 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 clutch discs.
- Before installing new No. 1 clutch discs, soak them in ATF for at least 15 minutes.

18. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Check if the contact surfaces of the No. 2 clutch discs, No. 2 clutch plates and No. 2 clutch flange are worn or burnt.

If necessary, replace them.



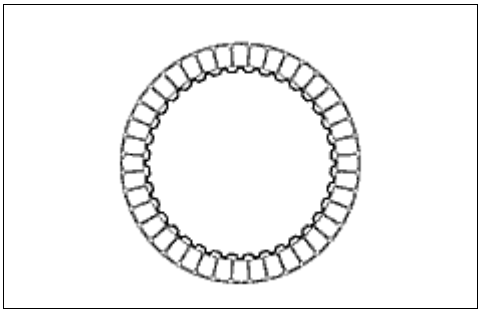
NOTICE:

- If the lining of any No. 2 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 clutch discs.
- Before installing new No. 2 clutch discs, soak them in ATF for at least 15 minutes.

19. INSPECT NO. 1 BRAKE DISC

(a) Check if the contact surfaces of the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are worn or burnt.

If necessary, replace them.



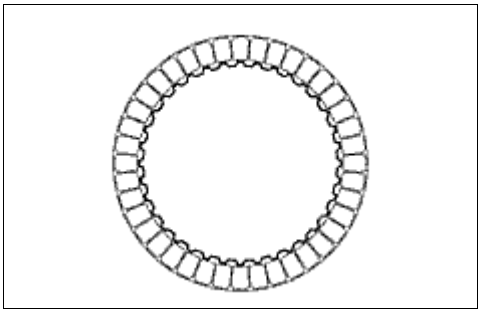
NOTICE:

- If the lining of any No. 1 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 brake discs.
- Before installing new No. 1 brake discs, soak them in ATF for at least 15 minutes.

20. INSPECT NO. 2 BRAKE DISC

(a) Check if the contact surfaces of the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

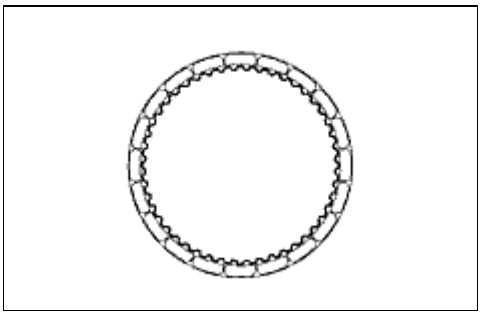
- If the lining of any No. 2 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 brake discs.
- Before installing new No. 2 brake discs, soak them in ATF for at least 15 minutes.

21. INSPECT NO. 4 BRAKE DISC

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(a) Check if the contact surfaces of the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

- If the lining of any No. 4 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 4 brake discs.
- Before installing new No. 4 brake discs, soak them in ATF for at least 15 minutes.

22. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH)

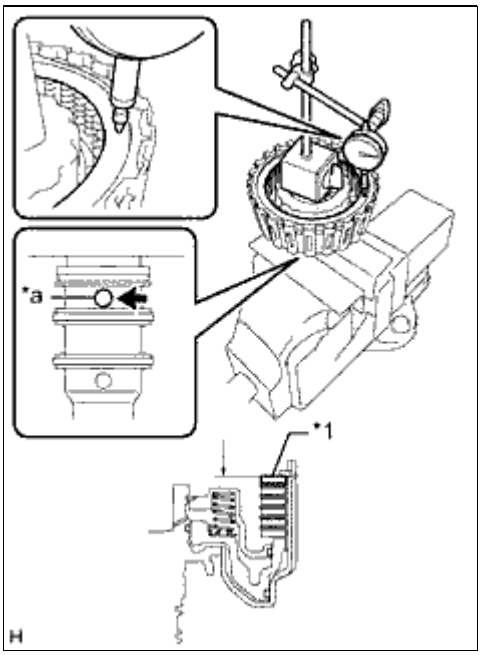
(a) Using a dial indicator, measure the clearance of the No. 1 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Forward Clutch Flange
*a	Oil Hole

Standard clearance:
0.75 to 1.05 mm (0.0296 to 0.0413 in.)

If the clearance is not as specified, select and install an appropriate forward clutch flange that will bring the clearance within the specified range.



HINT:

There are forward clutch flanges of different thicknesses.

Forward Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35635-04010	3.0 (0.118)
35635-04020	3.1 (0.122)
35635-04030	3.2 (0.126)
35635-04040	3.3 (0.130)
35635-04050	3.4 (0.134)
35635-04060	3.5 (0.138)
35635-04070	3.6 (0.142)
35635-04080	3.7 (0.146)
35635-04090	3.8 (0.150)
35635-04100	3.9 (0.154)
35635-04110	4.0 (0.157)

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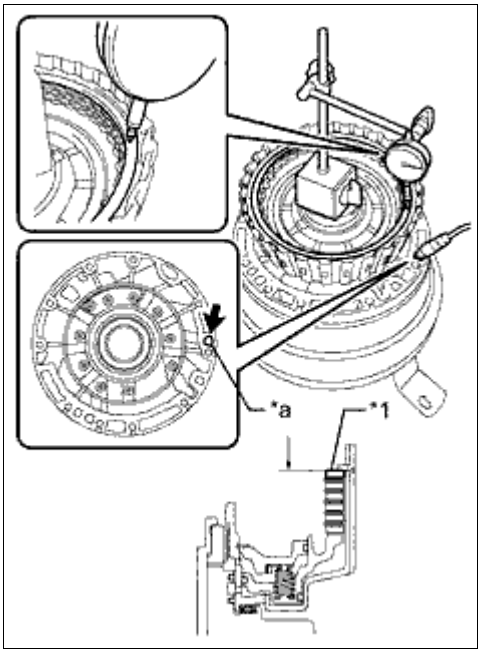
PART NO.	THICKNESS (MM (IN.))
35635-04120	4.1 (0.161)
35635-04130	4.2 (0.165)

23. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH)

(a) Using a dial indicator, measure the clearance of the No. 2 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Direct Clutch Flange
*a	Oil Hole



Standard clearance:
0.5 to 0.8 mm (0.0197 to 0.0314 in.)

If the clearance is not as specified, select and install an appropriate direct clutch flange that will bring the clearance within the specified range.

HINT:

There are direct clutch flanges of different thicknesses.

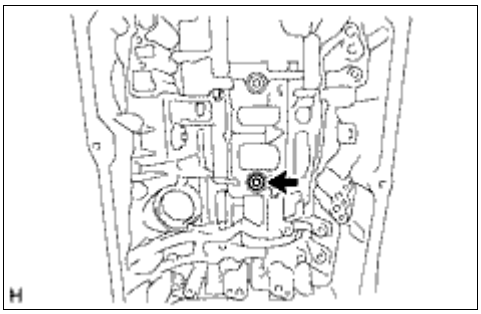
Direct Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35675-04010	3.0 (0.118)
35675-04020	3.1 (0.122)
35675-04030	3.2 (0.126)
35675-04040	3.3 (0.130)
35675-04050	3.4 (0.134)
35675-04060	3.5 (0.138)
35675-04070	3.6 (0.142)
35675-04080	3.7 (0.146)
35675-04090	3.8 (0.150)

24. INSPECT CLEARANCE OF NO. 1 BRAKE

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(a) Make sure that the No. 1 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



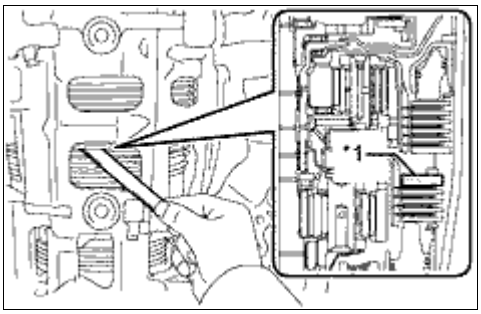
(b) Using a feeler gauge, measure the No. 1 brake pack clearance between the No. 1 brake disc and No. 1 brake flange.

Text in Illustration

*1	Selected No. 1 Brake Flange

Standard clearance:
0.4 to 0.7 mm (0.0158 to 0.0275 in.)

If the clearance is not as specified, select and install an appropriate No. 1 brake flange that will bring the clearance within the specified range.



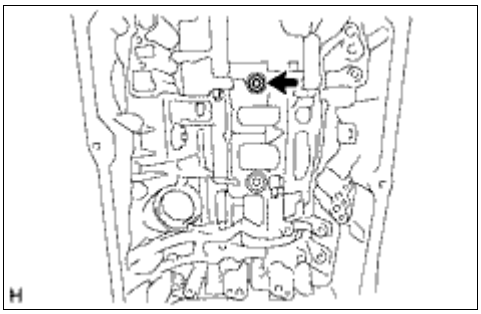
No. 1 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	4.9 (0.193)
1	5.0 (0.197)
2	5.1 (0.201)
3	5.2 (0.205)
4	5.3 (0.209)
5	5.4 (0.213)
6	5.5 (0.217)
7	5.6 (0.220)
8	5.7 (0.224)
A	5.8 (0.228)

25. INSPECT CLEARANCE OF NO. 2 BRAKE

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(a) Make sure that the No. 2 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



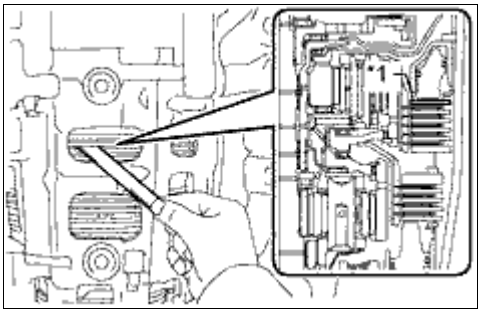
(b) Using a feeler gauge, measure the No. 2 brake pack clearance between the No. 2 brake disc and No. 2 brake flange.

Text in Illustration

*1	Selected No. 2 Brake Flange

Standard clearance:
0.5 to 0.8 mm (0.0197 to 0.0314 in.)

If the clearance is not as specified, select and install an appropriate No. 2 brake flange that will bring the clearance within the specified range.

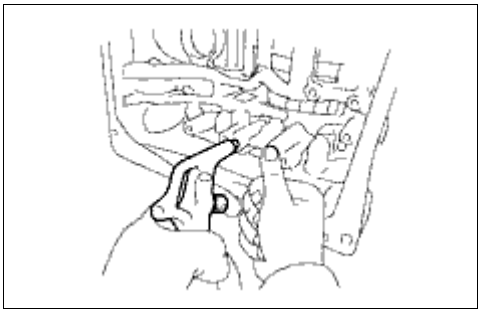


No. 2 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	2.0 (0.0787)
1	2.1 (0.0827)
2	2.2 (0.0866)
3	2.3 (0.0906)
4	2.4 (0.0945)
5	2.5 (0.0984)
6	2.6 (0.102)
7	2.7 (0.106)
8	2.8 (0.110)

26. INSPECT CLEARANCE OF NO. 4 BRAKE

(a) Make sure that the 1st and reverse brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



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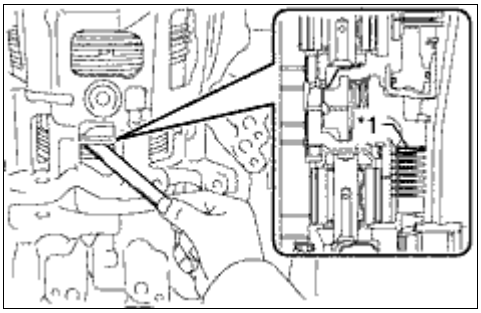
(b) Using a feeler gauge, measure the No. 4 brake pack clearance between the No. 4 brake disc and No. 4 brake flange.

Text in Illustration

*1	Selected No. 4 Brake Flange

Standard clearance:
0.7 to 1.0 mm (0.0276 to 0.0393 in.)

If the clearance is not as specified, select and install an appropriate No. 4 brake flange that will bring the clearance within the specified range.



No. 4 Brake Flange Thickness:

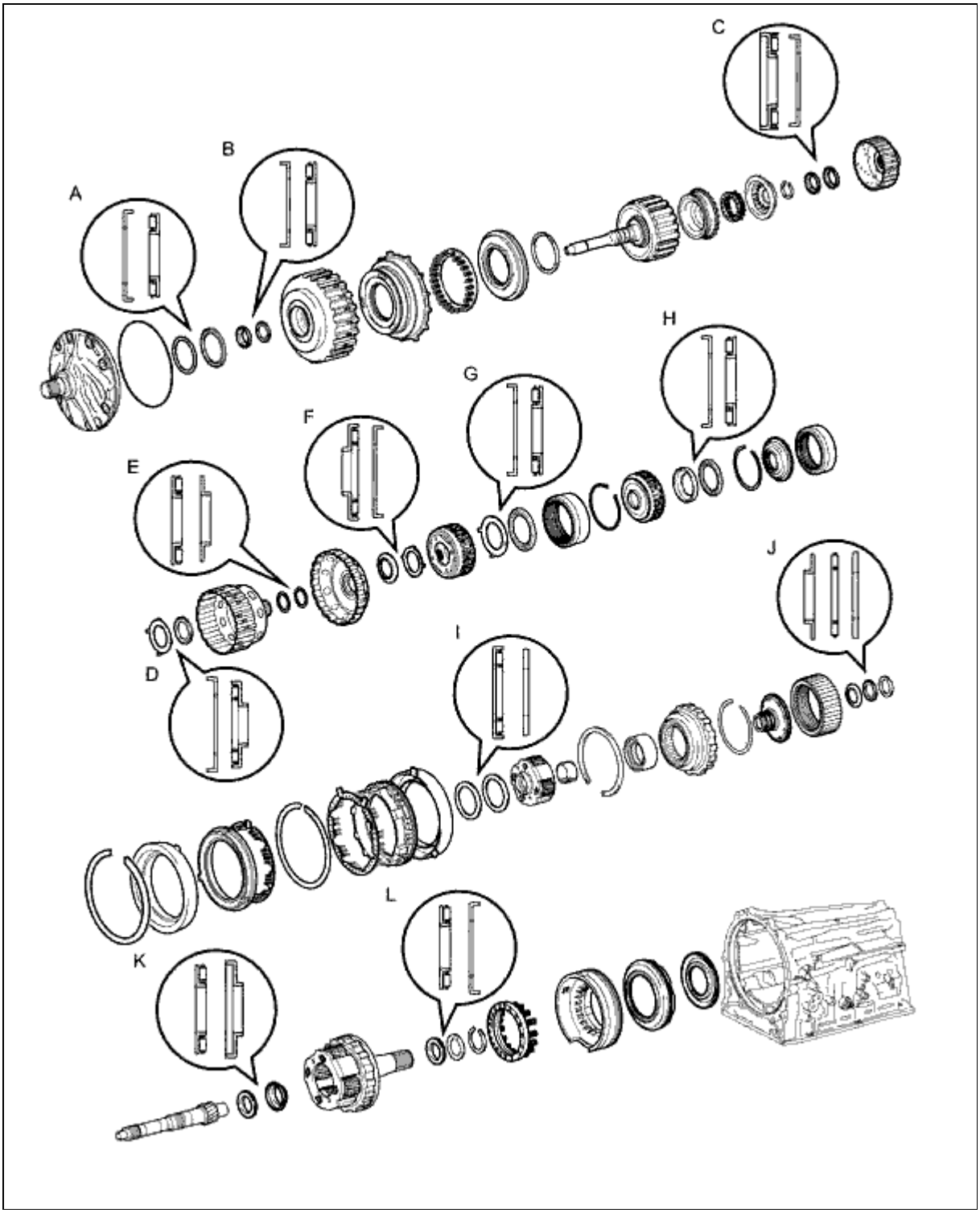
MARK	THICKNESS (MM (IN.))
0	1.8 (0.0709)
2	2.0 (0.0787)
4	2.2 (0.0866)
6	2.4 (0.0945)
8	2.6 (0.102)
10	2.8 (0.110)
12	3.0 (0.118)
14	3.2 (0.126)

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA004ZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. BEARING POSITION

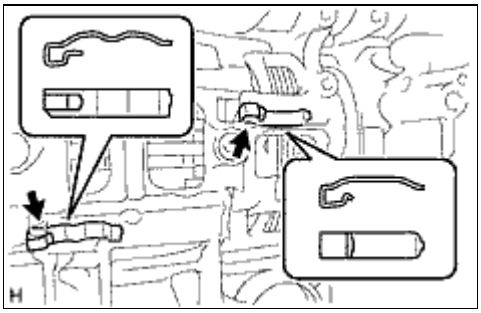


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MARK	FRONT RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))	THRUST BEARING DIAMETER INSIDE / OUTSIDE (MM (IN.))	REAR RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))
A	74.2 (2.921) / 87.74 (3.454)	71.9 (2.831) / 85.6 (3.370)	-
B	40.0 (1.575) / 52.8 (2.079)	34.6 (1.362) / 52.0 (2.047)	-
C	22.0 (0.866) / 44.8 (1.764)	21.3 (0.839) / 41.1 (1.618)	-
D	38.4 (1.512) / 56.5 (2.224)	33.3 (1.311) / 56.6 (2.228)	-
E	-	40.83 (1.607) / 52.8 (2.079)	39.6 (1.559) / 52.8 (2.079)
F	-	37.1 (1.461) / 61.2 (2.409)	44.0 (1.732) / 62.8 (2.472)
G	65.8 (2.591) / 86.3 (3.398)	63.3 (2.492) / 78.8 (3.102)	-
H	66.3 (2.610) / 78.9 (3.106)	63.3 (2.492) / 78.8 (3.102)	-
I	-	55.7 (2.193) / 76.4 (3.008)	53.7 (2.114) / 74.0 (2.913)
J	33.4 (1.315) / 49.0 (1.929)	32.1 (1.264) / 49.35 (1.943)	32.1 (1.264) / 49.0 (1.929)
K	-	21.0 (0.827) / 41.5 (1.634)	23.13 (0.911) / 41.5 (1.634)
L	-	43.55 (1.715) / 61.0 (2.402)	47.1 (1.854) / 67.1 (2.642)

2. INSTALL BRAKE PLATE STOPPER SPRING

(a) Install the 2 brake plate stopper springs to the automatic transmission case sub-assembly.



NOTICE:

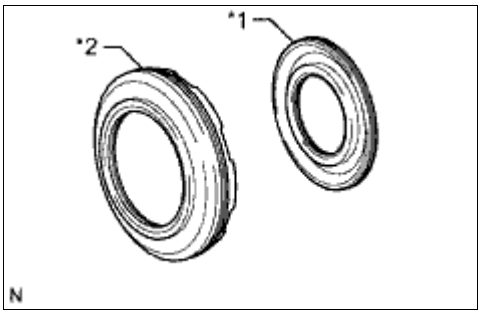
The shapes of the parts are different. Refer to the illustration when installing the parts.

3. INSTALL NO. 4 BRAKE PISTON

(a) Coat 2 new O-rings with ATF, and install them to the brake reaction sleeve.

(b) Coat 2 new O-rings with ATF, and install them to the No. 4 brake piston.

(c) Install the No. 4 brake piston to the brake reaction sleeve.



Text in Illustration

*1	No. 4 Brake Piston
*2	Brake Reaction Sleeve

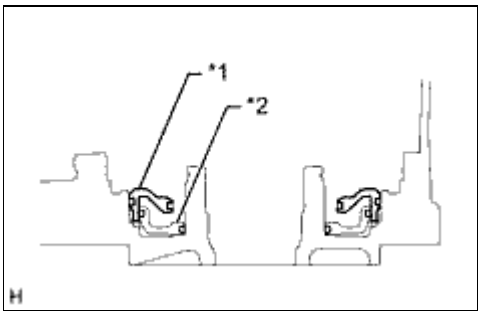
NOTICE:

Be careful not to damage the O-rings.

4. INSTALL BRAKE REACTION SLEEVE

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(a) With the No. 4 brake piston underneath (the rear side), install the brake reaction sleeve and No. 4 brake piston to the automatic transmission case sub-assembly.



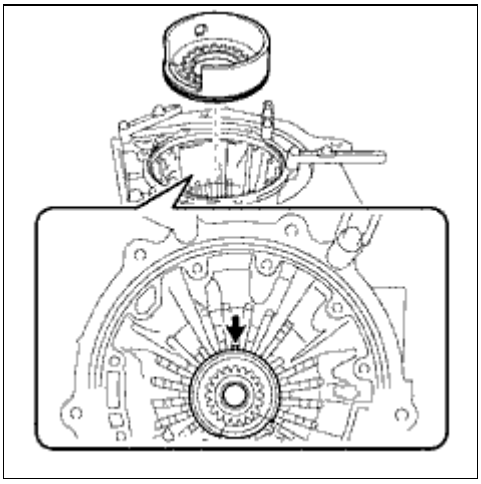
Text in Illustration

*1	Brake Reaction Sleeve
*2	No. 4 Brake Piston

NOTICE:

Be careful not to damage the O-rings.

5. INSTALL 1ST AND REVERSE BRAKE PISTON

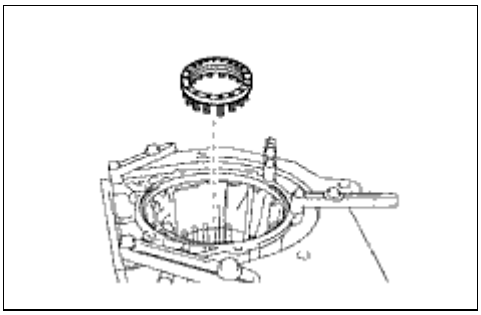


(a) Coat a new O-ring with ATF, and install it to the 1st and reverse brake piston.

(b) Install the 1st and reverse brake piston to the automatic transmission case sub-assembly while making sure that the protrusion of the 1st and reverse brake piston is positioned as shown in the illustration.

NOTICE:

Be careful not to damage the O-ring.

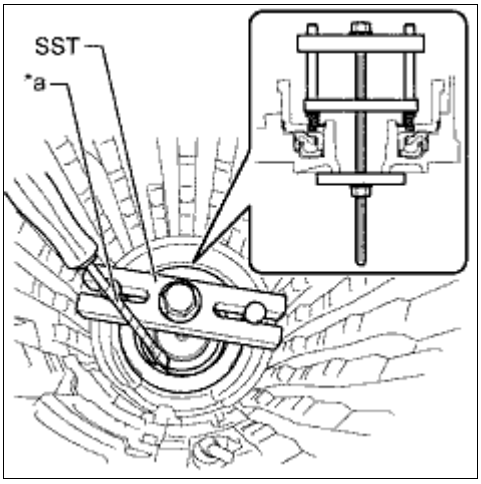


(c) Install the 1st and reverse brake return spring sub-assembly to the automatic transmission case sub-assembly.

(d) Place the 1st and reverse brake return spring sub-assembly onto the 1st and reverse brake piston.

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(e) Place SST on the 1st and reverse brake return spring sub-assembly, and compress the 1st and reverse brake return spring sub-assembly.



Text in Illustration

*a	Protective Tape

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

(f) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the 1st and reverse brake return spring sub-assembly and automatic transmission case sub-assembly.

HINT:

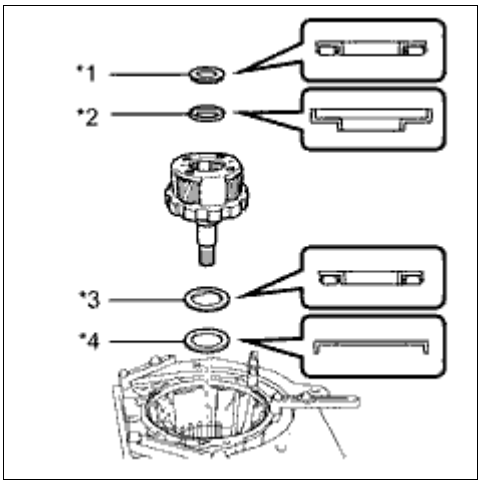
Tape the screwdriver tip before use.

6. INSTALL REAR PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing K
*2	Thrust Bearing Race K
*3	Thrust Needle Roller Bearing L
*4	Thrust Bearing Race L



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing K	21.0 (0.827)	41.5 (1.634)
Thrust Bearing Race K	23.13 (0.911)	41.5 (1.634)
Thrust Needle Roller Bearing L	43.55 (1.715)	61.0 (2.402)
Thrust Bearing Race L	47.1 (1.854)	67.1 (2.642)

NOTICE:

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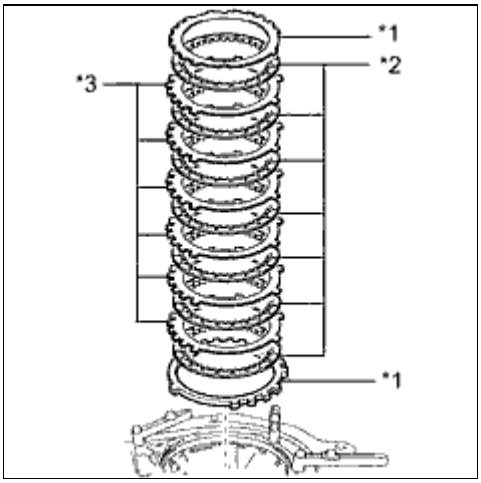
Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Coat the 2 thrust needle roller bearings and thrust bearing race with ATF and install them to the rear planetary gear assembly.

(c) Install the rear planetary gear assembly to the automatic transmission case sub-assembly.

7. INSTALL NO. 4 BRAKE DISC

(a) Install the 2 No. 4 brake flanges, 7 No. 4 brake discs and 6 No. 4 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

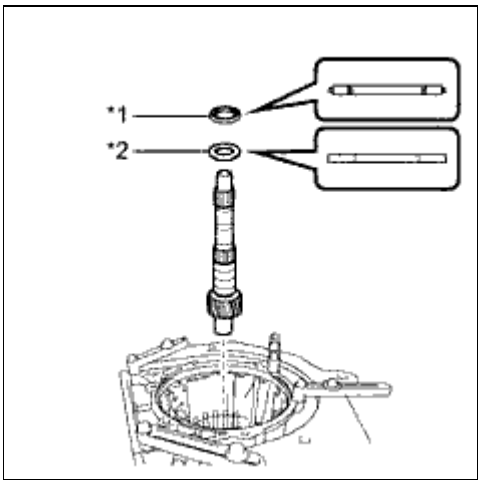
*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate

NOTICE:

- Make sure that the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are installed in the correct order.
- Install the thicker No. 4 brake flange first, and then install the thinner one.

8. INSTALL INTERMEDIATE SHAFT

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the intermediate shaft.



Text in Illustration

*1	Thrust Needle Roller Bearing J
*2	Thrust Bearing Race J (Rear Race)

Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

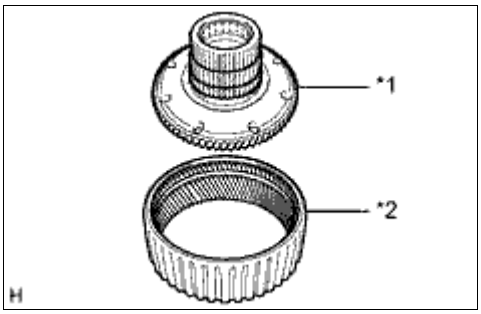
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing J	32.1 (1.264)	49.35 (1.943)
Thrust Bearing Race J (Rear Race)	32.1 (1.264)	49.0 (1.929)

(b) Install the intermediate shaft to the automatic transmission case sub-assembly.

9. INSTALL REAR PLANETARY RING GEAR

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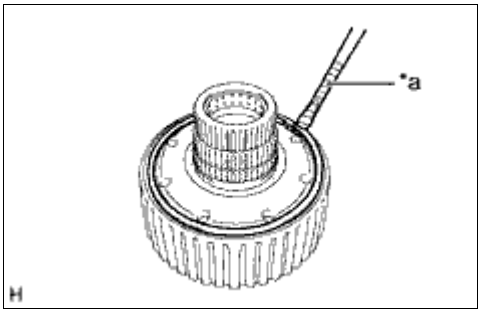
(a) Install the rear planetary ring gear to the rear planetary ring gear flange sub-assembly.



Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

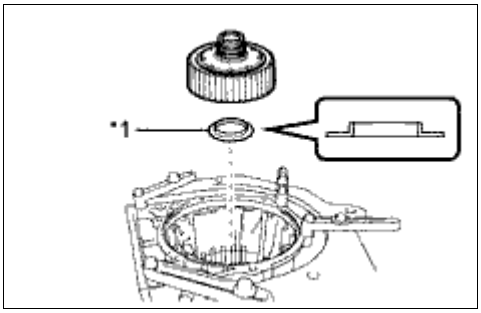
Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

Tape the screwdriver tip before use.

10. INSTALL REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

(a) Coat the thrust bearing race with ATF and install it to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*1	Thrust Bearing Race J (Front Race)

Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race J (Front Race)	33.4 (1.315.)	49.0 (1.929)

NOTICE:

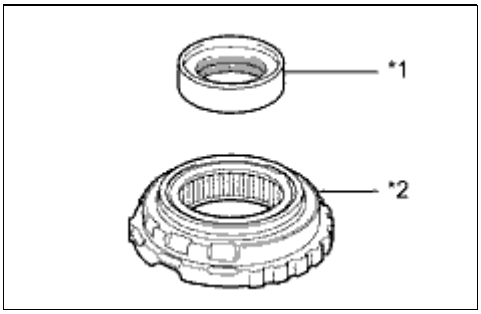
Be sure to install the thrust bearing race in the correct direction.

(b) Install the rear planetary ring gear flange sub-assembly with rear planetary ring gear to the automatic transmission case sub-assembly.

11. INSTALL ONE-WAY CLUTCH INNER RACE

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(a) Install the one-way clutch inner race to the No. 3 one-way clutch assembly.



Text in Illustration

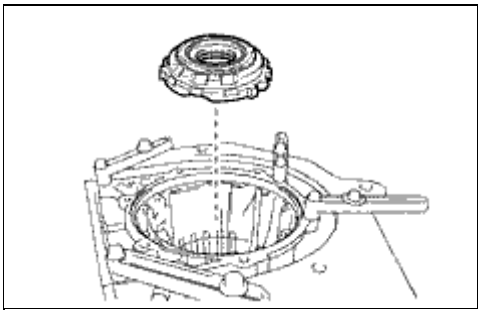
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly

HINT:

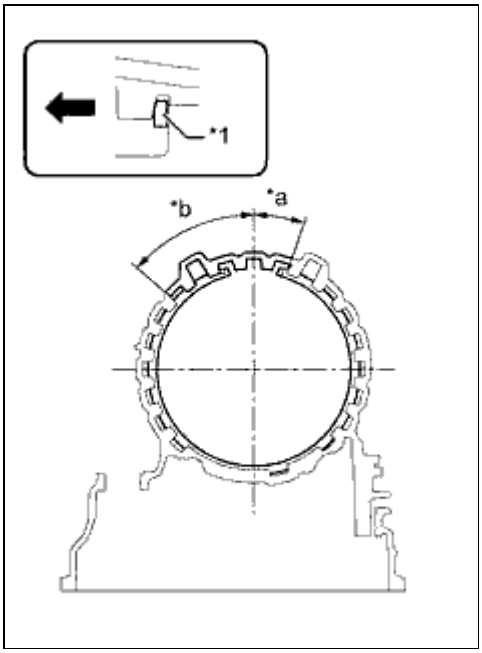
Rotate the one-way clutch inner race clockwise to install it.

12. INSTALL NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Install the No. 3 one-way clutch assembly with one-way clutch inner race to the automatic transmission case sub-assembly.



(b) Using SST, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*1	Snap Ring
*a	19°
*b	49°
➡	Front Side

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SST: 09350-30020

09350-07060

NOTICE:

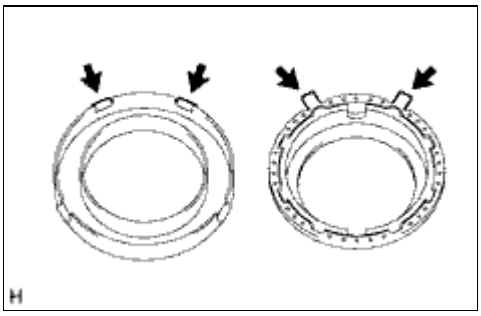
- Install the snap ring so that the tapered side is facing out.
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.

13. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

14. INSTALL NO. 1 BRAKE PISTON

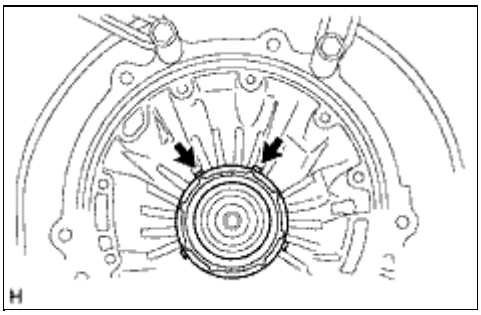
(a) Coat 2 new O-rings with ATF and install them to the No. 1 brake piston.

(b) With the No. 1 brake piston return spring sub-assembly installed to the No. 1 brake piston, align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston to the No. 1 brake cylinder.



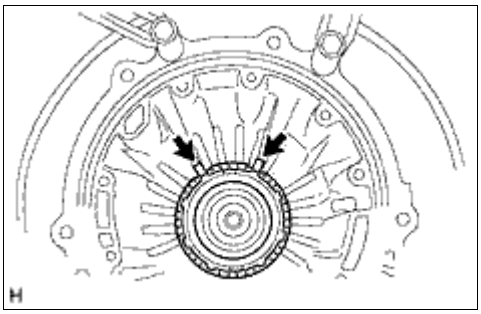
15. INSTALL NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

(a) Install the No. 1 brake cylinder with No. 1 brake piston to the automatic transmission case sub-assembly while making sure that the 2 claws of the No. 1 brake cylinder with No. 1 brake piston are positioned as shown in the illustration.



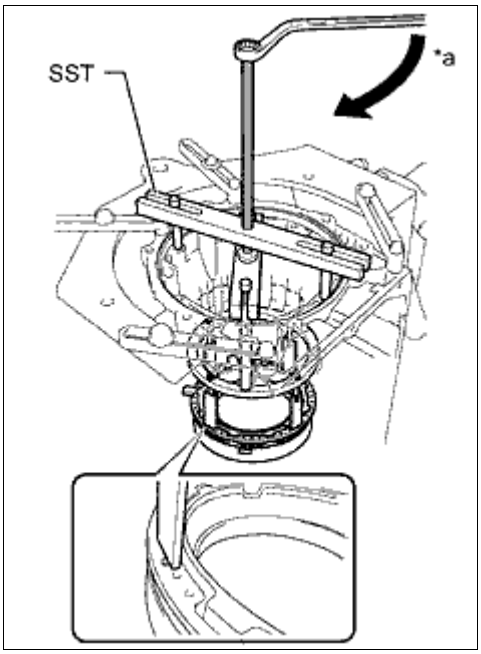
16. INSTALL NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston return spring sub-assembly to the No. 1 brake piston.



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(b) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



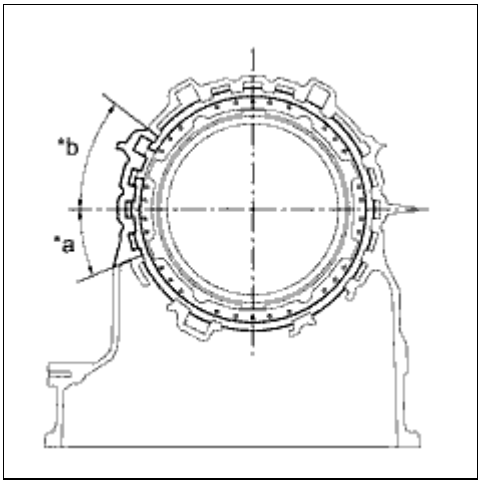
Text in Illustration

*a	Turn

SST: 09380-60011

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09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(c) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

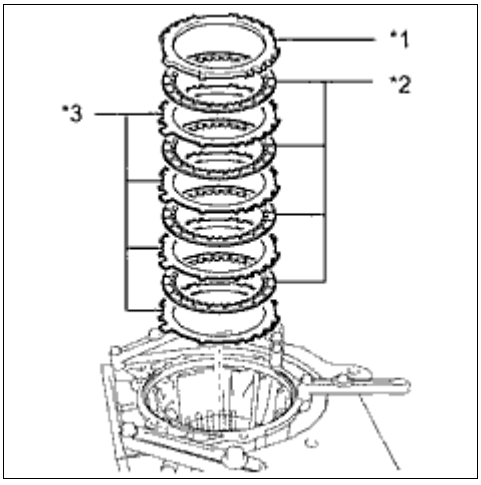
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

17. INSTALL NO. 1 BRAKE DISC

(a) Install the No. 1 brake flange, 4 No. 1 brake discs and 4 No. 1 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

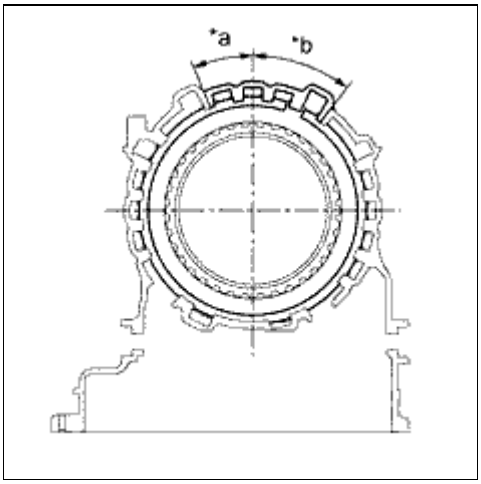
*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

NOTICE:

Make sure that the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are installed in the correct order.

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(b) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

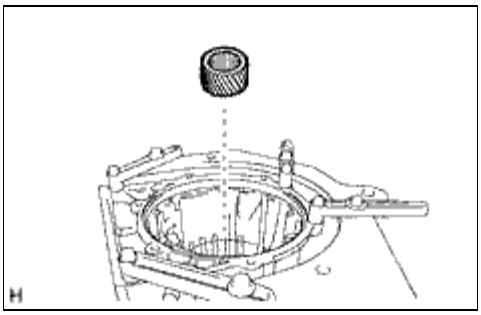
HINT:

Tape the screwdriver tip before use.

18. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

19. INSTALL PLANETARY SUN GEAR

(a) Install the planetary sun gear to the automatic transmission case sub-assembly.

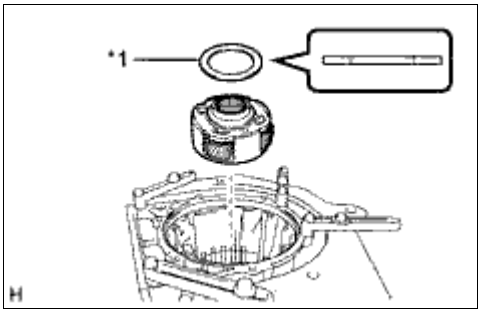


20. INSTALL CENTER PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the center planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race I



Thrust Bearing Race Diameter:

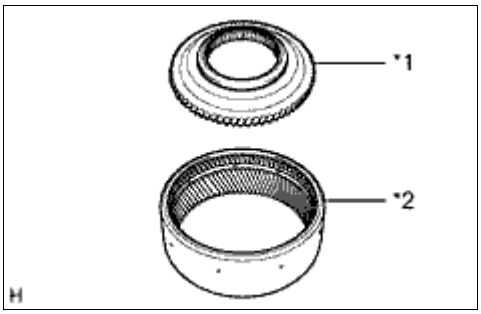
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race I	53.7 (2.114)	74.0 (2.913)

(b) Install the center planetary gear assembly to the automatic transmission case sub-assembly.

21. INSTALL CENTER PLANETARY RING GEAR

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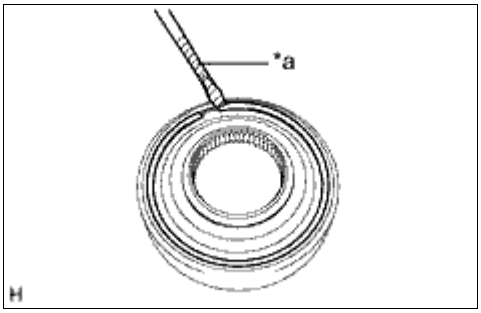
(a) Install the center planetary ring gear to the center planetary ring gear flange.



Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the center planetary ring gear flange with center planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

HINT:

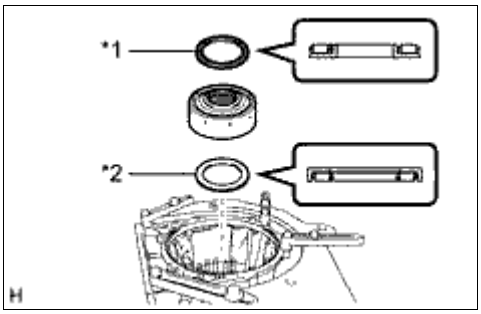
Tape the screwdriver tip before use.

22. INSTALL CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

(a) Coat the 2 thrust needle roller bearings with ATF and install them to the center planetary ring gear flange with center planetary ring gear.

Text in Illustration

*1	Thrust Needle Roller Bearing H
*2	Thrust Needle Roller Bearing I



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing H	63.3 (2.492)	78.8 (3.102)
Thrust Needle Roller Bearing I	55.7 (2.193)	76.4 (3.008)

NOTICE:

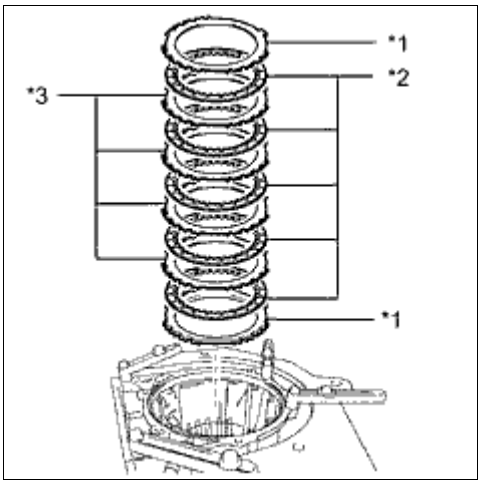
Be sure to install the thrust needle roller bearing in the correct direction.

(b) Install the center planetary ring gear flange with center planetary ring gear to the automatic transmission case sub-assembly.

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23. INSTALL NO. 2 BRAKE DISC

(a) Install the 2 No. 2 brake flanges, 5 No. 2 brake discs and 4 No. 2 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate

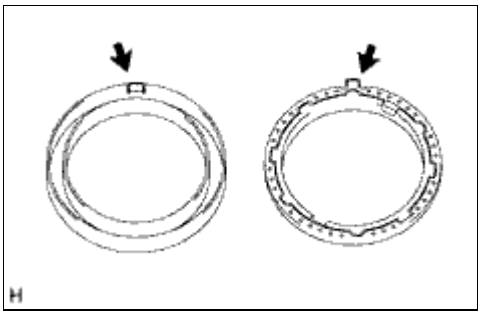
NOTICE:

- Make sure that the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are installed in the correct order.
- Install the thicker No. 2 brake flange first, and then install the thinner one.

24. INSTALL NO. 2 BRAKE PISTON

(a) Coat 2 new O-rings with ATF and install them to the No. 2 brake piston.

(b) With the No. 2 brake piston return spring sub-assembly installed to the No. 2 brake piston, align the claw of the No. 2 brake piston return spring sub-assembly with the claw of the No. 2 brake cylinder, and then install the No. 2 brake piston to the No. 2 brake cylinder.

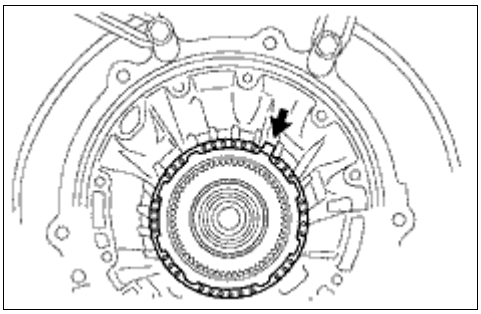


NOTICE:

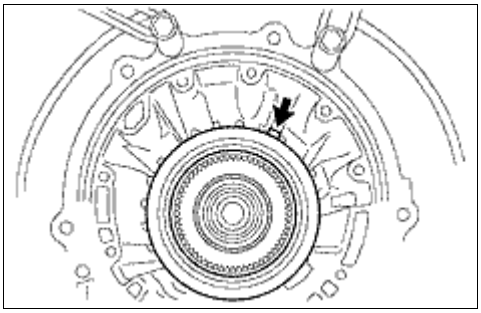
Be careful not to damage the O-rings.

25. INSTALL NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Install the No. 2 brake piston return spring sub-assembly to the automatic transmission case sub-assembly while making sure that the claw of the No. 2 brake piston return spring sub-assembly is positioned as shown in the illustration.

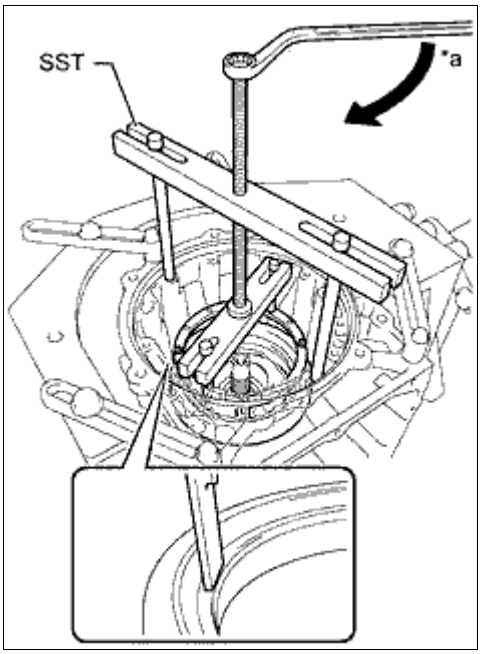


(b) Install the No. 2 brake cylinder with No. 2 brake piston to the automatic transmission case sub-assembly while making sure that the claw of the No. 1 brake cylinder with No. 1 brake piston is positioned as shown in the illustration.



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(c) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



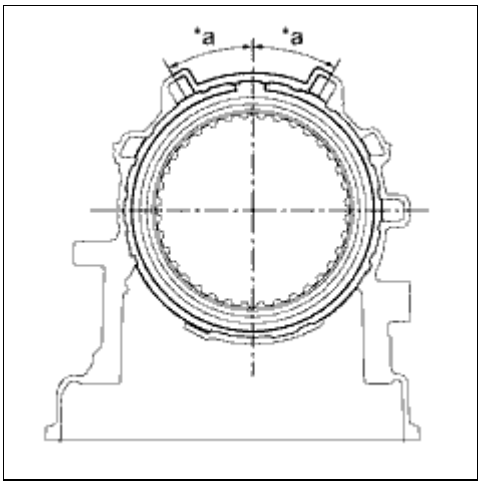
Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06020
09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(d) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	30°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

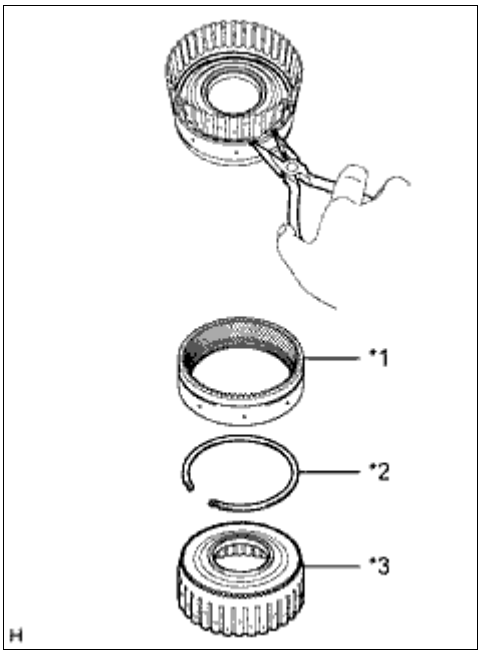
Tape the screwdriver tip before use.

26. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

27. INSTALL FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

cardiagn.com

(a) Set the snap ring onto the front planetary ring gear flange sub-assembly. Using needle-nose pliers, insert the snap ring into the front planetary ring gear while squeezing it, and then expand the snap ring to install it.



Text in Illustration

*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly

NOTICE:

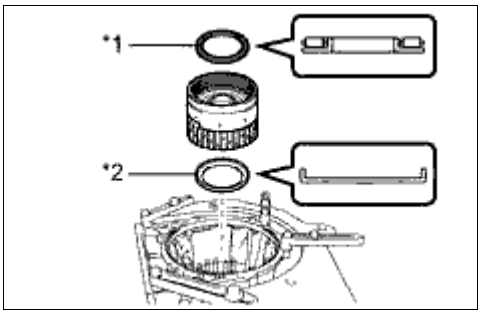
Make sure the snap ring is securely inserted into the groove of the front planetary ring gear.

28. INSTALL FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the front planetary ring gear with front planetary ring gear flange sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing G
*2	Thrust Bearing Race H



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing G	63.3 (2.492)	78.8 (3.102)
Thrust Bearing Race H	66.3 (2.610)	78.9 (3.106)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the front planetary ring gear with front planetary ring gear flange sub-assembly to the automatic transmission case sub-assembly.

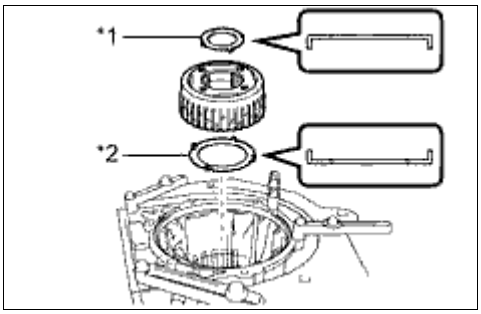
29. INSTALL FRONT PLANETARY GEAR ASSEMBLY

cardiagn.com

(a) Coat the 2 thrust bearing races with ATF and install them to the front planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race F
*2	Thrust Bearing Race G



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race F	44.0 (1.732)	62.8 (2.472)
Thrust Bearing Race G	65.8 (2.591)	86.3 (3.398)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

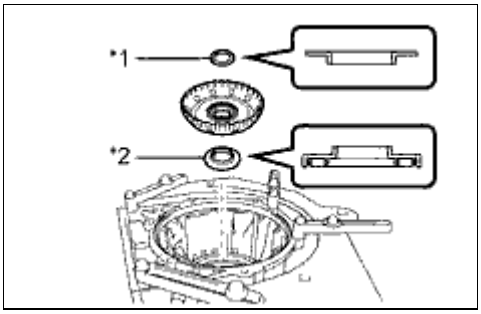
(b) Install the front planetary gear assembly to the automatic transmission case sub-assembly.

30. INSTALL SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the sun gear input drum sub-assembly.

Text in Illustration

*1	Thrust Bearing Race E
*2	Thrust Needle Roller Bearing F



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race E	40.83 (1.607)	52.8 (2.079)
Thrust Needle Roller Bearing F	37.1 (1.461)	61.2 (2.409)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the sun gear input drum sub-assembly to the automatic transmission case sub-assembly.

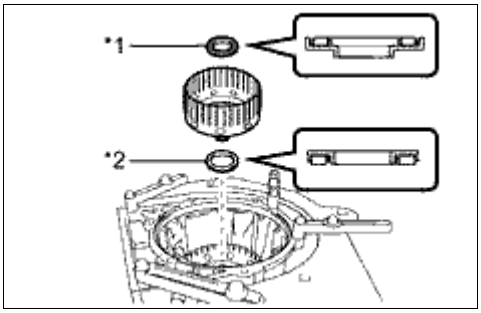
31. INSTALL FORWARD CLUTCH HUB SUB-ASSEMBLY

cardiagn.com

(a) Coat the 2 thrust needle roller bearings with ATF and install them to the forward clutch hub sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing D
*2	Thrust Needle Roller Bearing E



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing D	33.3 (1.311)	56.6 (2.228)
Thrust Needle Roller Bearing E	39.6 (1.559)	52.8 (2.079)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

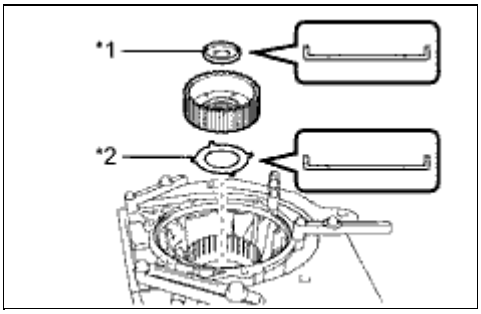
(b) Install the forward clutch hub sub-assembly to the automatic transmission case sub-assembly.

32. INSTALL MULTIPLE DISC CLUTCH HUB

(a) Coat the 2 thrust bearing races with ATF and install them to the multiple disc clutch hub.

Text in Illustration

*1	Thrust Bearing Race C
*2	Thrust Bearing Race D



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race C	22.0 (0.866)	44.8 (1.764)
Thrust Bearing Race D	38.4 (1.512)	56.5 (2.224)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

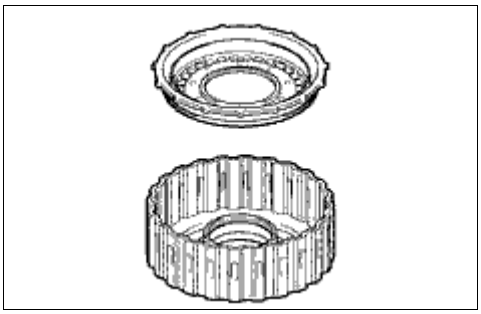
(b) Install the multiple disc clutch hub to the automatic transmission case sub-assembly.

33. INSTALL DIRECT CLUTCH PISTON

(a) Coat 2 new O-rings with ATF, and install them to the direct clutch piston.

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(b) Install the direct clutch piston to the direct clutch drum sub-assembly.

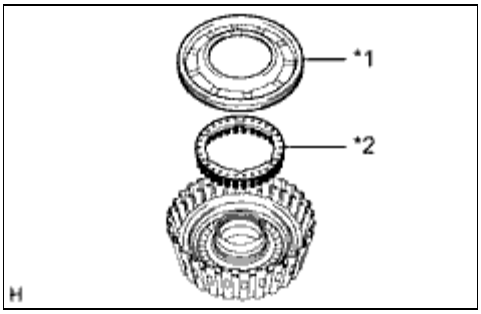


NOTICE:

Be careful not to damage the O-rings.

34. INSTALL NO. 2 CLUTCH BALANCER

(a) Install the direct clutch return spring sub-assembly to the direct clutch piston.



Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly

(b) Coat a new O-ring with ATF, and install it to the No. 2 clutch balancer.

(c) Install the No. 2 clutch balancer to the direct clutch drum sub-assembly.

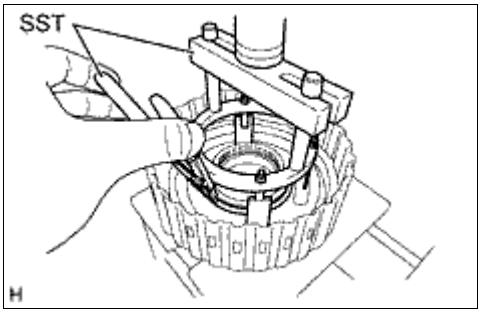
NOTICE:

Be careful not to damage the O-ring.

(d) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(e) Using SST, install the snap ring.

SST: 09350-30020

09350-07070

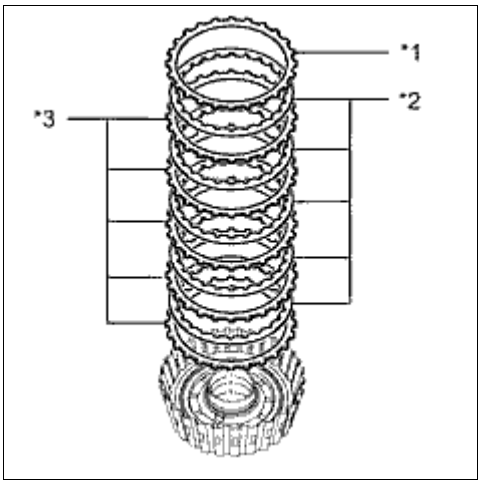
NOTICE:

Do not expand the snap ring excessively.

35. INSTALL NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

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(a) Install the 5 No. 2 clutch plates, 5 No. 2 clutch discs and direct clutch flange to the direct clutch drum sub-assembly.



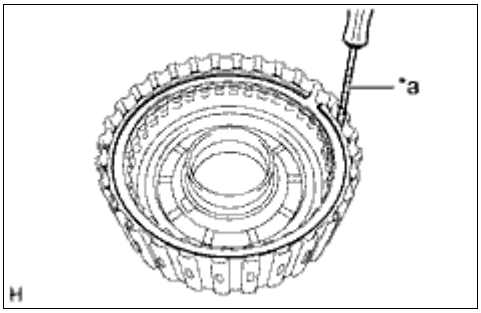
Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

NOTICE:

Make sure that the No. 2 clutch discs, No. 2 clutch plates and direct clutch flange are installed in the correct order.

(b) Using a screwdriver, install the snap ring to the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

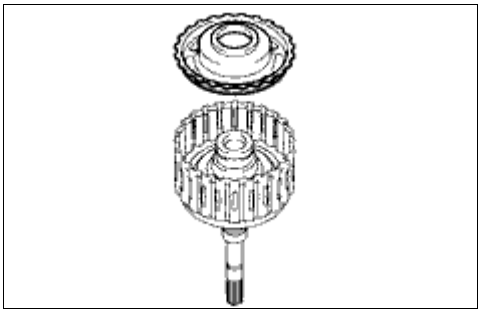
36. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

37. INSTALL FORWARD CLUTCH PISTON

(a) Coat a new O-ring with ATF, and install it to the input shaft sub-assembly.

(b) Coat a new O-ring with ATF, and install it to the forward clutch piston.

(c) Install the forward clutch piston to the input shaft sub-assembly.



NOTICE:

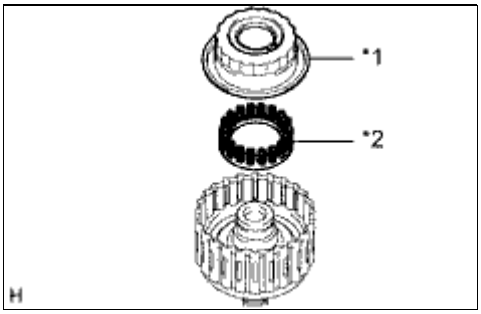
Be careful not to damage the O-rings.

38. INSTALL NO. 1 CLUTCH BALANCER

(a) Coat a new O-ring with ATF, and install it to the No. 1 clutch balancer.

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(b) Install the forward clutch return spring sub-assembly and No. 1 clutch balancer to the input shaft sub-assembly.



Text in Illustration

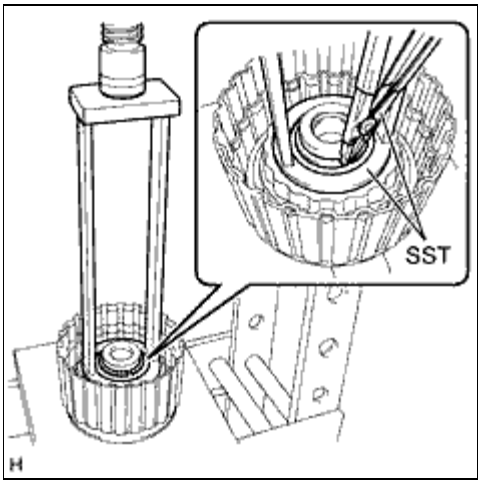
*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

NOTICE:

Be careful not to damage the O-ring.

(c) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(d) Using SST, install the snap ring.

SST: 09350-30020

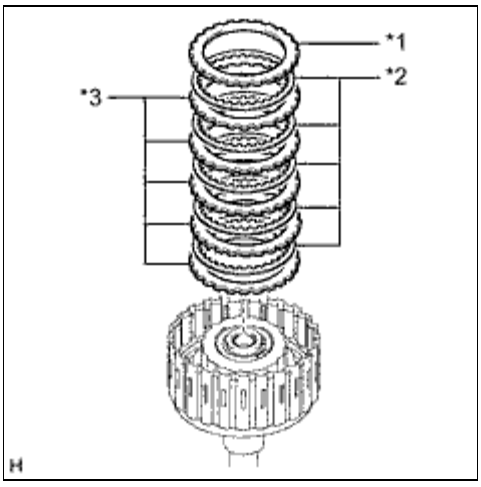
09350-07070

NOTICE:

Do not expand the snap ring excessively.

39. INSTALL NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Install the 5 No. 1 clutch plates, 5 No. 1 clutch discs and forward clutch flange to the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

NOTICE:

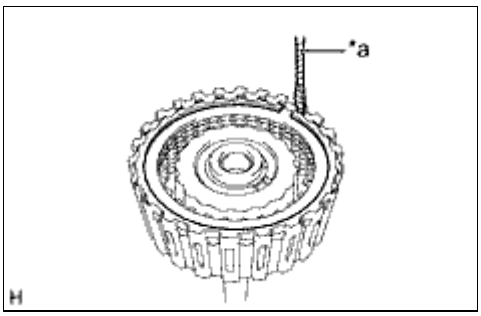
Make sure that the No. 1 clutch discs, No. 1 clutch plates and forward clutch flange are installed in the correct order.

cardiagn.com

(b) Using a screwdriver, install the snap ring.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the input shaft sub-assembly.

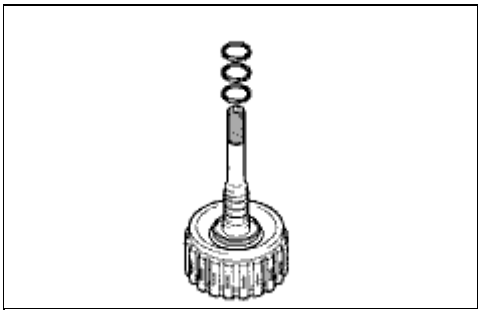
HINT:

Tape the screwdriver tip before use.

40. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH DISC) INFO

41. INSTALL CLUTCH DRUM OIL SEAL RING

(a) Coat 3 new clutch drum oil seal rings with ATF and install them to the input shaft sub-assembly.



NOTICE:

Do not expand the clutch drum oil seal ring ends excessively.

HINT:

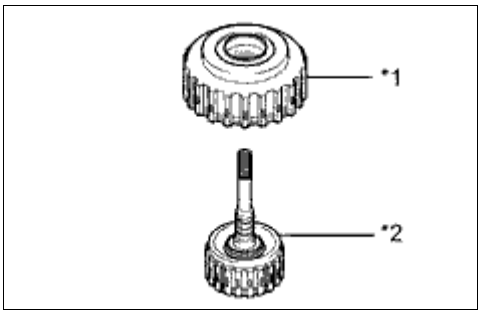
After installing the clutch drum oil seal rings, check that they rotate smoothly.

42. INSTALL DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Install the direct clutch drum sub-assembly to the input shaft sub-assembly.

Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly



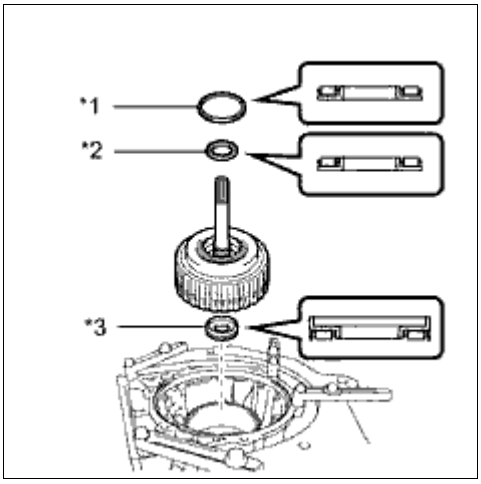
43. INSTALL CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

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(a) Coat the 3 thrust needle roller bearings with ATF and install them to the clutch drum and input shaft assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing A
*2	Thrust Needle Roller Bearing B
*3	Thrust Needle Roller Bearing C



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing A	71.9 (2.831)	85.6 (3.370)
Thrust Needle Roller Bearing B	34.6 (1.362)	52.0 (2.047)
Thrust Needle Roller Bearing C	21.3 (0.839)	41.1 (1.618)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

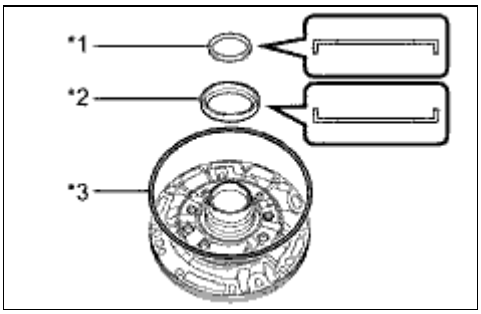
(b) Install the clutch drum and input shaft assembly to the automatic transmission case sub-assembly.

44. INSTALL OIL PUMP ASSEMBLY

(a) Coat the 2 thrust bearing races with ATF and install them to the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race B
*2	Thrust Bearing Race A
*3	Oil Pump O-ring



Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race B	40.0 (1.575)	52.8 (2.079)
Thrust Bearing Race A	74.2 (2.921)	87.74 (3.454)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

(b) Coat a new oil pump O-ring with ATF, and install it to the oil pump assembly.

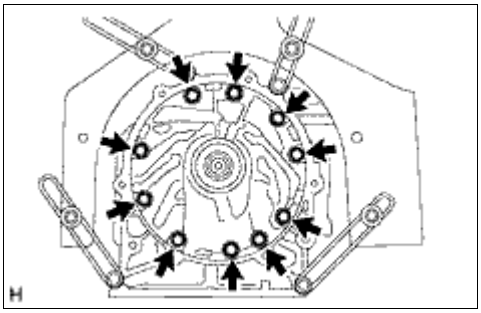
cardiagn.com

(c) Set the oil pump assembly on the input shaft, and align the bolt holes of the oil pump assembly with the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the oil pump O-ring.

(d) Temporarily install the oil pump assembly to the automatic transmission case sub-assembly.

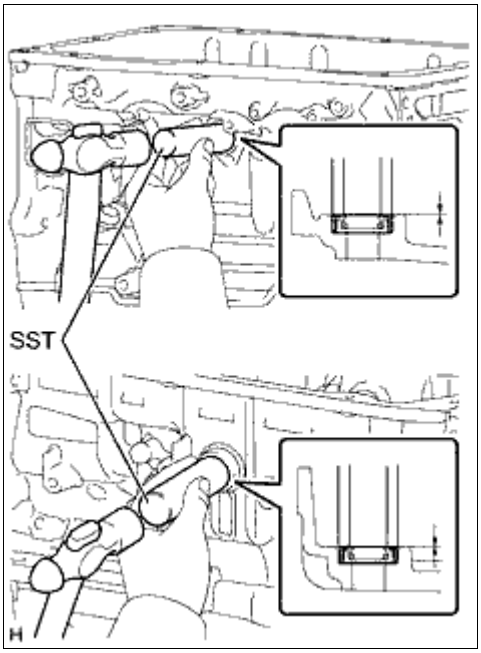


(e) Install the oil pump assembly with the 10 bolts.

Torque:

21 N·m {215 kgf·cm, 16ft·lbf}

45. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL



(a) Using SST and a hammer, drive in 2 new manual valve lever shaft oil seals to the automatic transmission case sub-assembly.

SST: 09350-30020

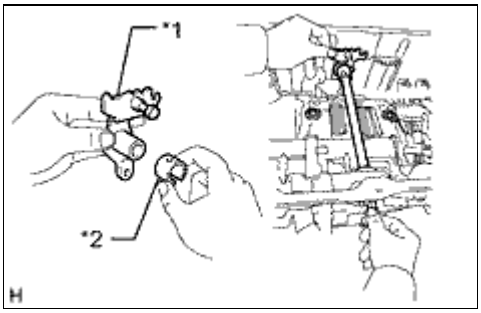
09350-07110

Standard depth:

-0.5 to 0.5 mm (-0.0196 to 0.0196 in.)

(b) Coat the lip of the manual valve lever shaft oil seal with MP grease.

46. INSTALL MANUAL VALVE LEVER SUB-ASSEMBLY



(a) Install a new spacer to the manual valve lever sub-assembly.

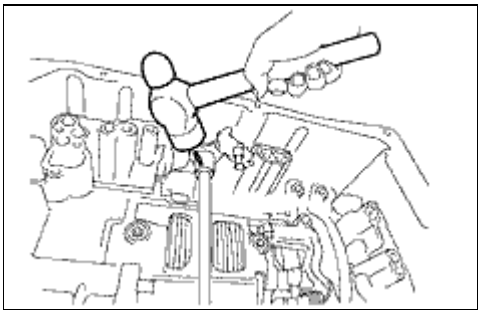
Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Spacer

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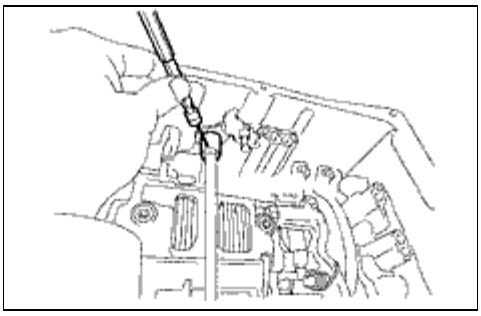
(b) Install the manual valve lever shaft to the automatic transmission case sub-assembly through the manual valve lever sub-assembly.

(c) Using a hammer, drive in a new spring pin.



(d) Turn the spacer and manual valve lever shaft to align the smaller hole on the spacer with the indent on the manual valve lever sub-assembly.

(e) Using a 3 mm pin punch and a hammer, stake the spacer.



(f) Check that the spacer does not turn.

(g) Make sure that the shaft rotates smoothly.

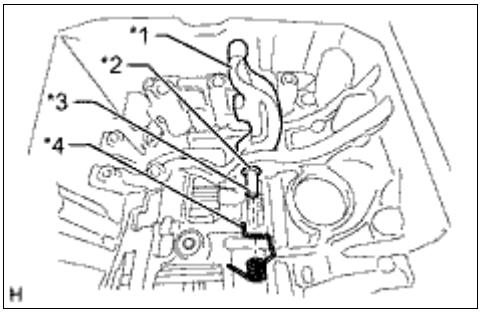
47. INSTALL PARKING LOCK PAWL SHAFT

(a) Install the E-ring to the parking lock pawl shaft.

(b) Install the parking lock pawl, parking lock pawl shaft and spring to the automatic transmission case sub-assembly.

Text in Illustration

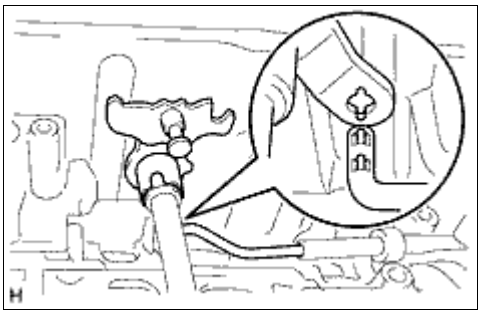
*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring



48. INSTALL PARKING LOCK ROD SUB-ASSEMBLY

cardiagn.com

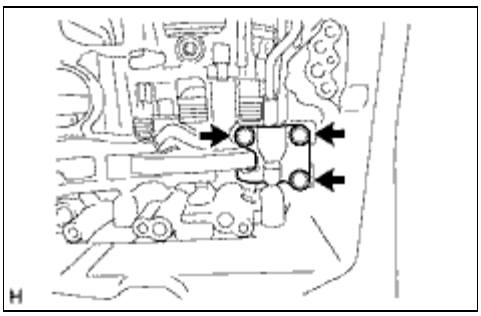
(a) Install the parking lock rod sub-assembly to the manual valve lever sub-assembly.



49. INSTALL PARKING LOCK PAWL BRACKET

(a) Install the parking lock pawl bracket to the automatic transmission case sub-assembly with the 3 bolts.

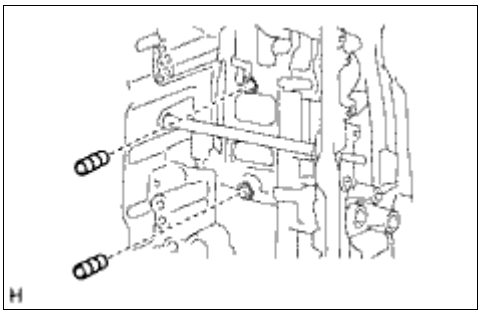
Torque:
18 N·m {184 kgf·cm, 13ft·lbf}



(b) Move the manual valve lever sub-assembly to P, and check the output shaft is locked by the parking lock pawl.

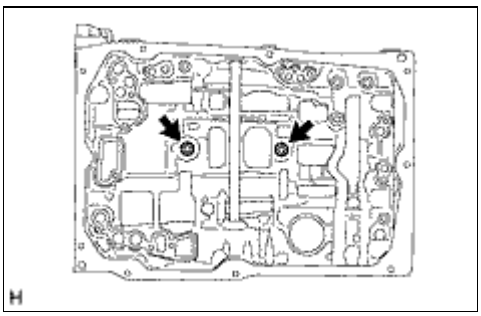
50. INSTALL BRAKE DRUM GASKET

(a) Coat 2 new brake drum gaskets with ATF and install them to the automatic transmission case sub-assembly.



51. INSTALL TRANSMISSION CASE GASKET

(a) Coat 2 new transmission case gaskets with ATF and install them to the automatic transmission case sub-assembly.



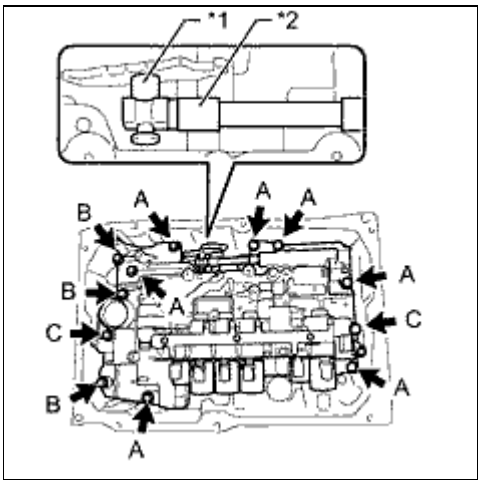
52. INSTALL TRANSMISSION VALVE BODY ASSEMBLY

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(a) Insert the manual valve lever sub-assembly into the groove on the end of the manual valve and install the transmission valve body assembly to the automatic transmission case sub-assembly with the 12 bolts.

Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Manual Valve



Torque:

11 N·m {112 kgf·cm, 8ft·lbf}

HINT:

Each bolt length is indicated below.

Bolt length:

Bolt A

25 mm (0.984 in.)

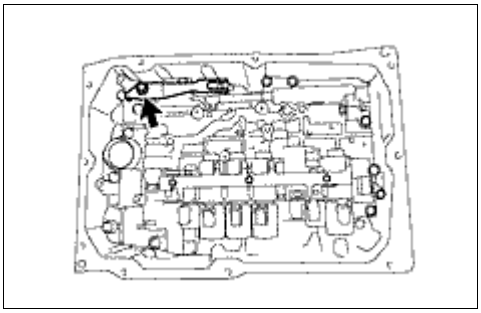
Bolt B

36 mm (1.42 in.)

Bolt C

50 mm (1.97 in.)

(b) Install the detent spring and detent spring cover to the transmission valve body assembly with the bolt.



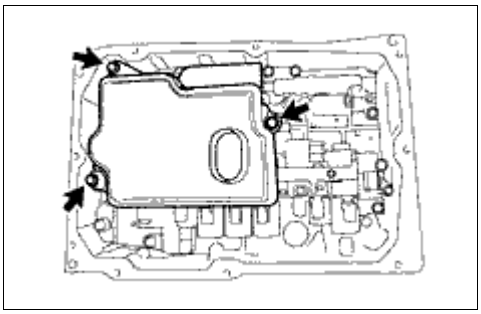
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

53. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the valve body oil strainer assembly.

(b) Install the valve body oil strainer assembly to the transmission valve body assembly with the 3 bolts.



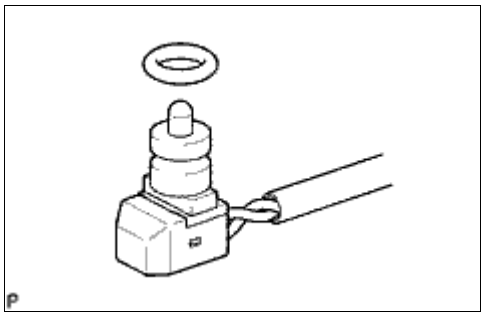
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

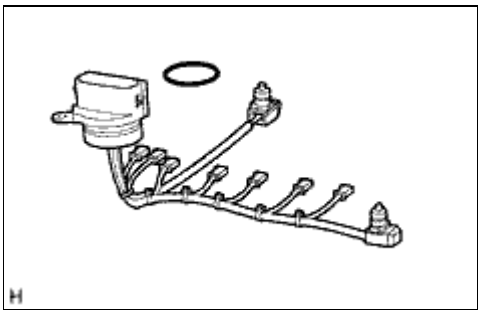
54. INSTALL TRANSMISSION WIRE

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(a) Coat 2 new O-rings with ATF, and install them to the 2 temperature sensors.



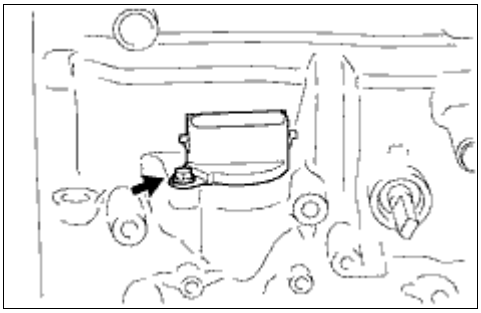
(b) Coat a new O-ring with ATF, and install it to the transmission wire.



(c) Install the transmission wire to the automatic transmission case sub-assembly with the bolt.

Torque:

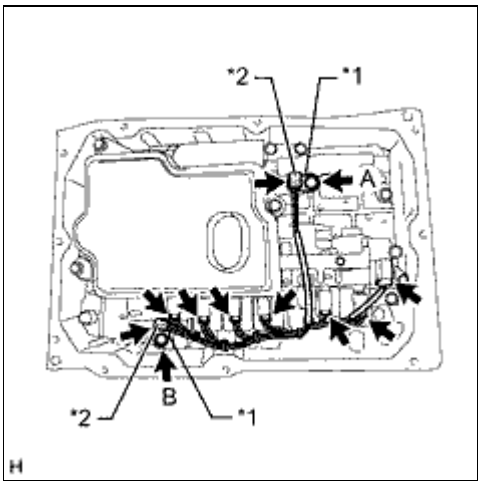
5.4 N·m {55 kgf·cm, 48in·lbf}



(d) Connect the 7 solenoid valve connectors.

Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor



(e) Install the 2 temperature sensors and 2 temperature sensor clamps to the transmission valve body assembly with the bolt.

Torque:

for Bolt A -

10 N·m {102 kgf·cm, 7ft·lbf}

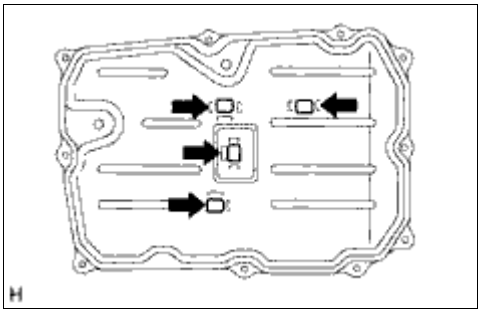
for Bolt B -

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11 N·m {112 kgf·cm, 8ft·lbf}

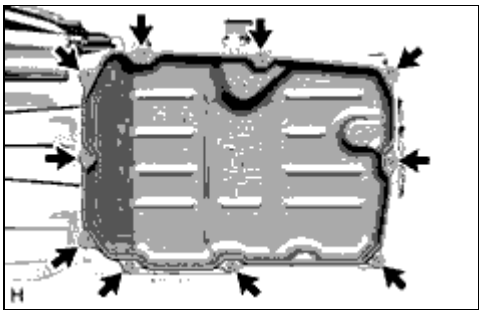
55. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Install the 4 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly as shown in the illustration.



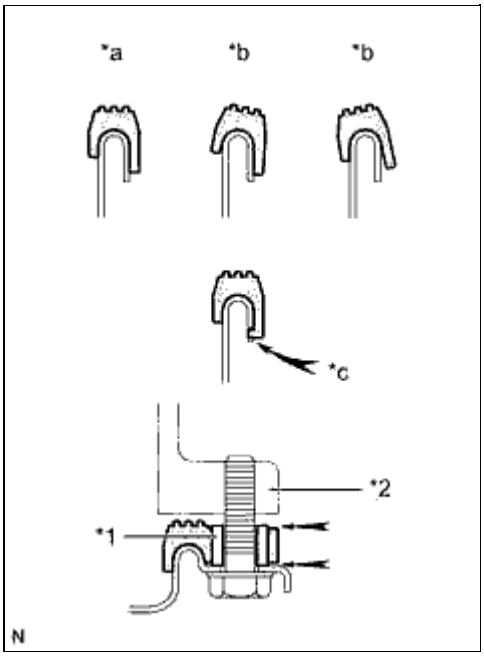
(b) Install a new automatic transmission oil pan gasket to the automatic transmission oil pan sub-assembly.

(c) Install the automatic transmission oil pan sub-assembly with automatic transmission oil pan gasket to the automatic transmission case sub-assembly with the 10 bolts.



Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}



Text in Illustration

*1	Sleeve
*2	Automatic Transmission Case Sub-assembly

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*a	Correct
*b	Incorrect
*c	Protrusion

NOTICE:

- Make sure that automatic transmission oil pan gasket seal surface and automatic transmission oil pan sub-assembly contact surface are free of oil and foreign matter.
- Install the automatic transmission oil pan gasket so that there is no slack in the automatic transmission oil pan gasket, and the entire seal surface is level.
- Make sure that the 8 protrusions are properly engaged to the automatic transmission oil pan sub-assembly.
- When installing the automatic transmission oil pan sub-assembly, make sure that the automatic transmission oil pan gasket is not pinched between the sleeve and the seal surface of the automatic transmission case sub-assembly.

(d) Install the drain plug and a new gasket to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

(e) Using a 5 mm hexagon socket wrench, install a new gasket and overflow plug to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

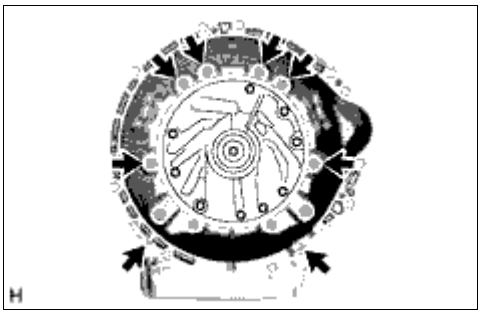
56. INSTALL AUTOMATIC TRANSMISSION HOUSING

(a) Clean and degrease the bolts and bolt holes with non-residue solvent.

(b) Install the automatic transmission housing to the automatic transmission case sub-assembly with the 8 bolts.

Torque:

34 N·m {346 kgf·cm, 25ft·lbf}



(c) Apply adhesive to 2 or 3 threads on the end of the 4 bolts.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(d) Install 4 bolts to the automatic transmission housing.

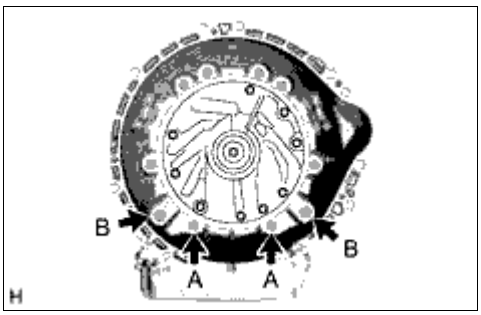
Torque:

for Bolt A (M10 bolt) -

34 N·m {346 kgf·cm, 25ft·lbf}

for Bolt B (M12 bolt) -

57 N·m {579 kgf·cm, 42ft·lbf}



57. INSTALL AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

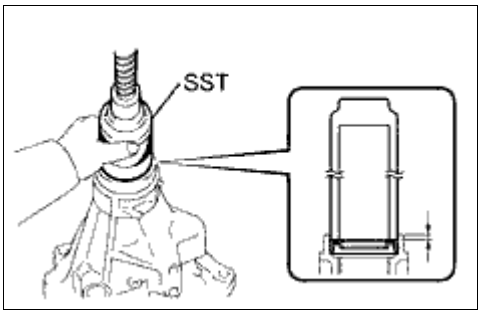
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(a) Using SST and a press, install a new automatic transmission extension housing oil seal to the extension housing sub-assembly.

SST: 09309-37010

Standard depth:

5.4 to 5.8 mm (0.213 to 0.228 in.)



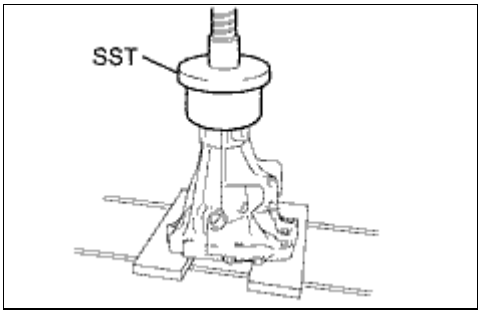
(b) Coat the lip of the automatic transmission extension housing oil seal with MP grease.

58. INSTALL EXTENSION HOUSING DUST DEFLECTOR

(a) Using SST and a press, install a new extension housing dust deflector to the extension housing sub-assembly.

SST: 09550-55011

09550-05081



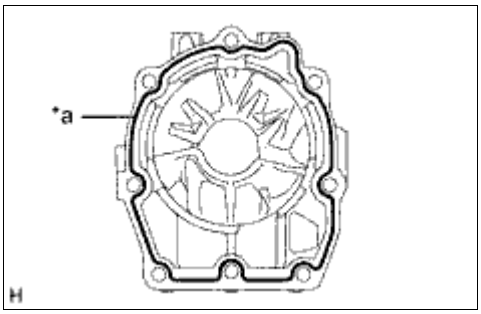
59. INSTALL EXTENSION HOUSING SUB-ASSEMBLY

(a) Clean and degrease the threads of the 8 bolts, bolt holes and the contact surfaces of the automatic transmission case sub-assembly and extension housing sub-assembly with non-residue solvent.

(b) Apply seal packing to the extension housing sub-assembly as shown in the illustration.

Text in Illustration

*a	Seal Packing



Seal packing:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

- Apply seal packing in a continuous line (width 1.2 mm (0.0472 in.)) along the sealing surface.
- After applying seal packing, install the extension housing sub-assembly to the automatic transmission case sub-assembly within 3 minutes and tighten the bolts within 10 minutes.

(c) Apply adhesive to 2 or 3 threads on the end of the 8 bolts.

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

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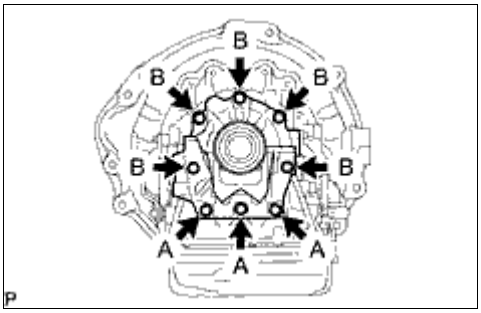
(d) Install the extension housing sub-assembly to the automatic transmission case sub-assembly with the 8 bolts.

Torque:

34 N·m {346 kgf·cm, 25ft·lbf}

Bolt Length:

Bolt A	40 mm (1.57 in.)
Bolt B	45 mm (1.77 in.)



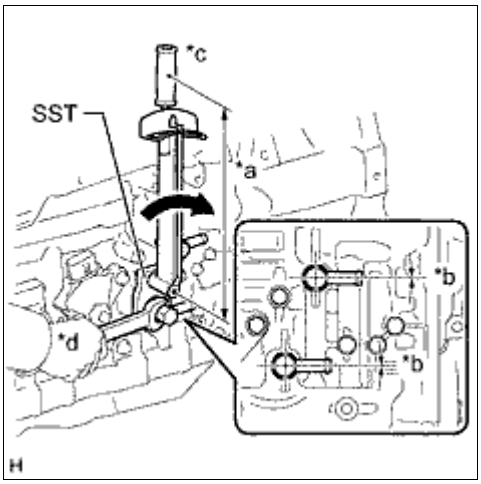
60. INSTALL OIL COOLER TUBE UNION

(a) Coat 2 new O-rings with ATF and install them to the 2 oil cooler tube unions.

(b) Using SST, install the 2 oil cooler tube unions to the automatic transmission case sub-assembly.

Text in Illustration

*a	Torque Wrench Fulcrum Length
*b	-2° to 2°
*c	Turn
*d	Hold



SST: 09268-78010

Torque:

31 N·m {317 kgf·cm, 23ft·lbf}

HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using SST (fulcrum length of 34.5 mm (1.36 in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 26 N*m (266 kgf*cm, 19 ft.*lbf)

61. INSTALL AUTOMATIC TRANSMISSION CASE PLUG

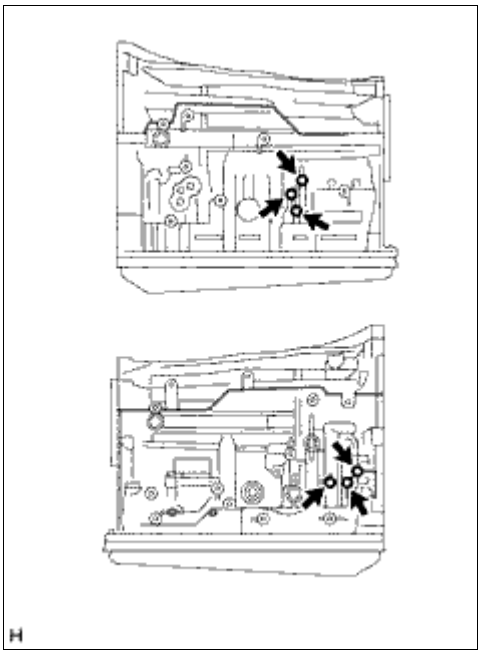
(a) Coat 6 new O-rings with ATF, and install them to the 6 automatic transmission case plugs.

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(b) Install the 6 automatic transmission case plugs to the automatic transmission case sub-assembly.

Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}

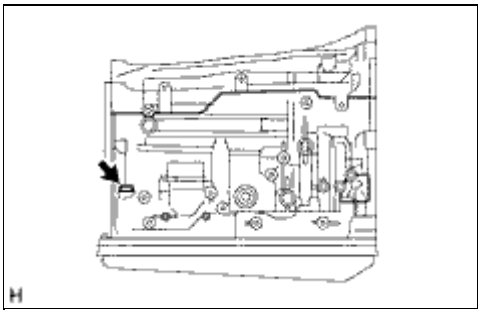


(c) Coat a new O-ring with ATF, and install it to the automatic transmission case plug.

(d) Using a T55 "TORX" socket wrench, install the automatic transmission case plug to the automatic transmission case sub-assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



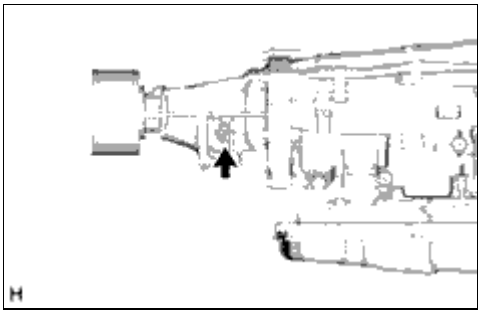
62. INSTALL REFILL PLUG

(a) Coat a new O-ring with ATF, and install it to the refill plug.

(b) Install the refill plug to the extension housing sub-assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



63. INSTALL PARK/NEUTRAL POSITION SWITCH

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

(a) Clean the bolt and bolt hole.

(b) Apply adhesive to 2 or 3 threads on the end of the bolt.

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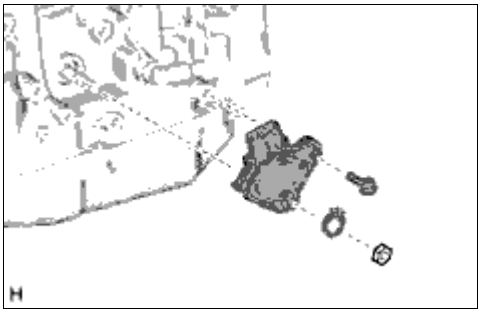
Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

Install the bolt within 3 minutes of applying adhesive.

(c) Temporarily install the park/neutral position switch to the automatic transmission case sub-assembly with the bolt.



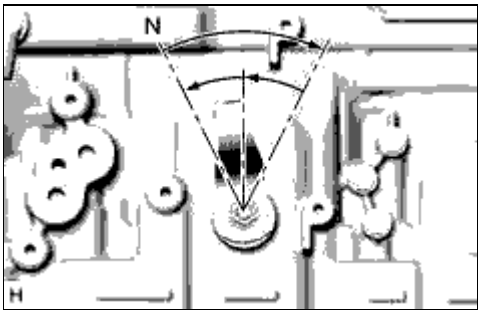
(d) Install a lock washer and nut to the park/neutral position switch.

Torque:

6.9 N·m {70 kgf·cm, 61in·lbf}

(e) Temporarily install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

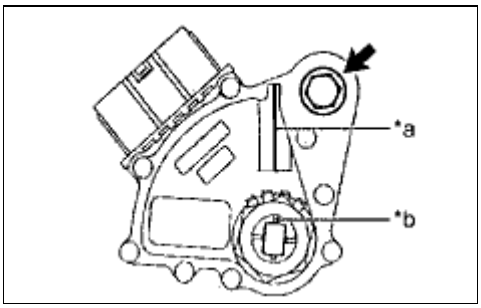
(f) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(g) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.

Text in Illustration

*a	Neutral Basic Line
*b	Groove



Torque:

13 N·m {131 kgf·cm, 9ft·lbf}

(h) Using a screwdriver, bend the tabs of the lock washer.

NOTICE:

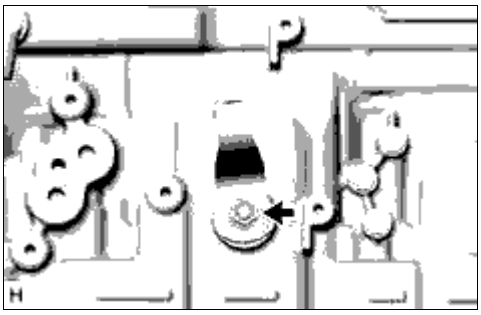
- Be careful not to damage the park/neutral position switch.
- Bend at least 2 of the lock washer tabs.

HINT:

Tape the screwdriver tip before use.

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64. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH

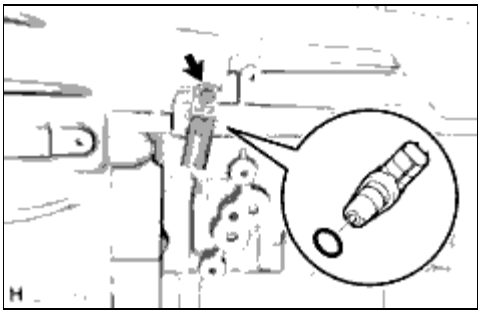


(a) Install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

Torque:

16 N·m {160 kgf·cm, 12ft·lbf}

65. INSTALL TRANSMISSION REVOLUTION SENSOR

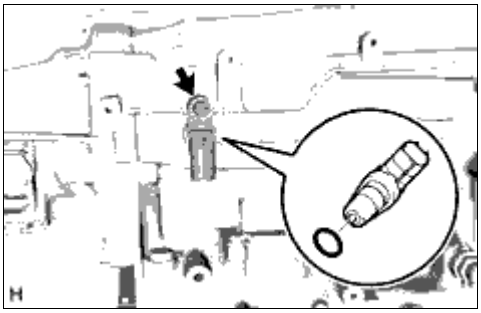


(a) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (NT).

(b) Install the transmission revolution sensor (NT) to the automatic transmission case sub-assembly with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}



(c) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (SP2).

(d) Install the transmission revolution sensor (SP2) to the automatic transmission case sub-assembly with the bolt.

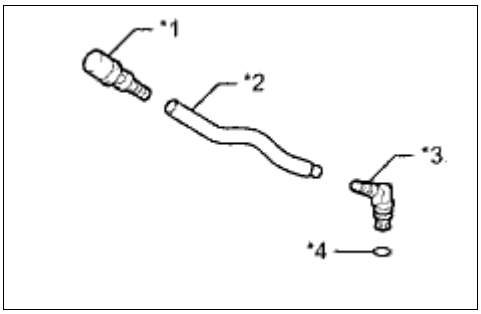
Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

66. INSTALL BREATHER PLUG HOSE

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(a) Install the breather plug sub-assembly and breather plug to the breather plug hose.



Text in Illustration

*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring

(b) Coat a new O-ring with ATF, and install it to the breather plug.

(c) Install the breather plug hose to the automatic transmission case sub-assembly.



NOTICE:

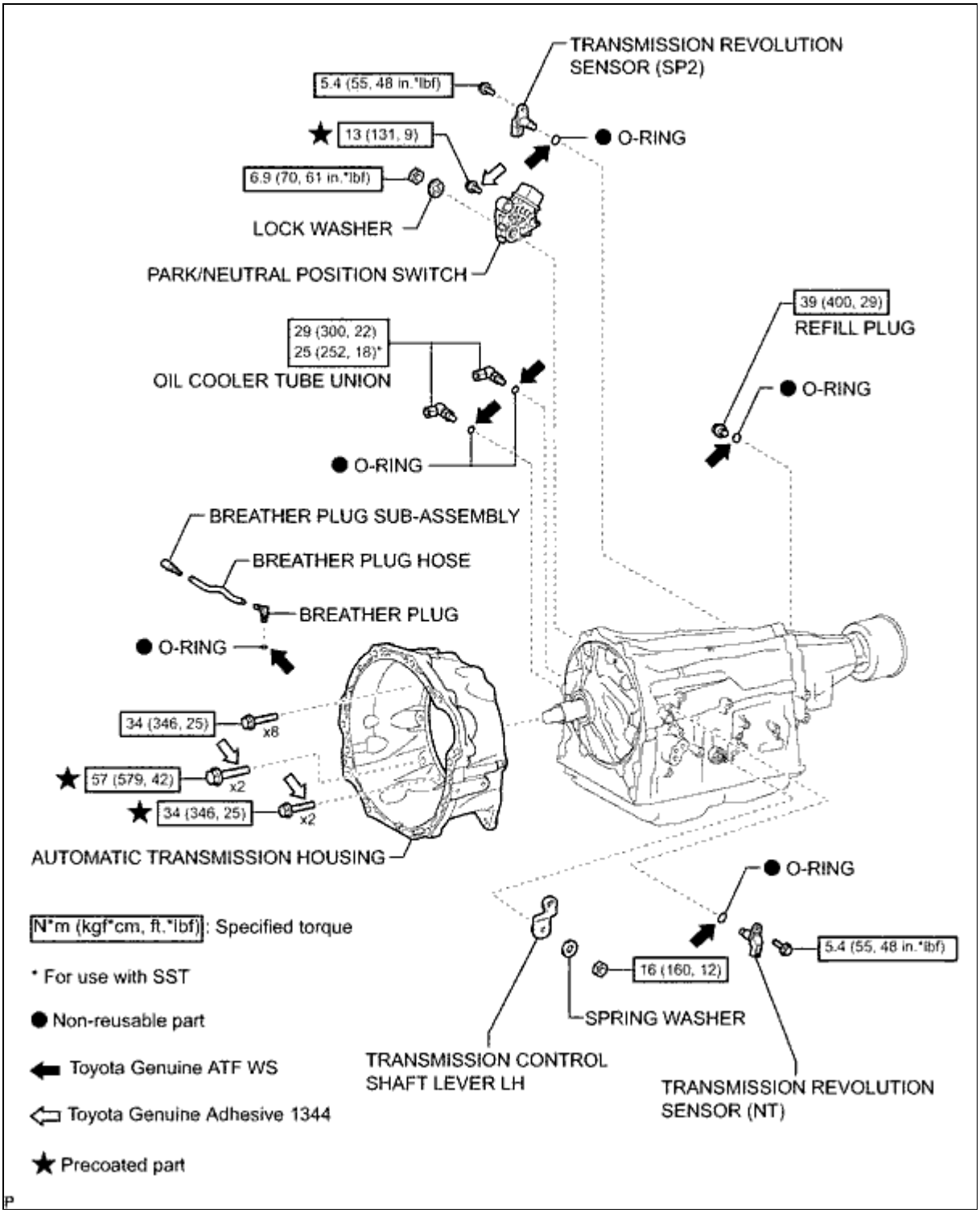
Be careful not to damage the O-rings.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000O9X044X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

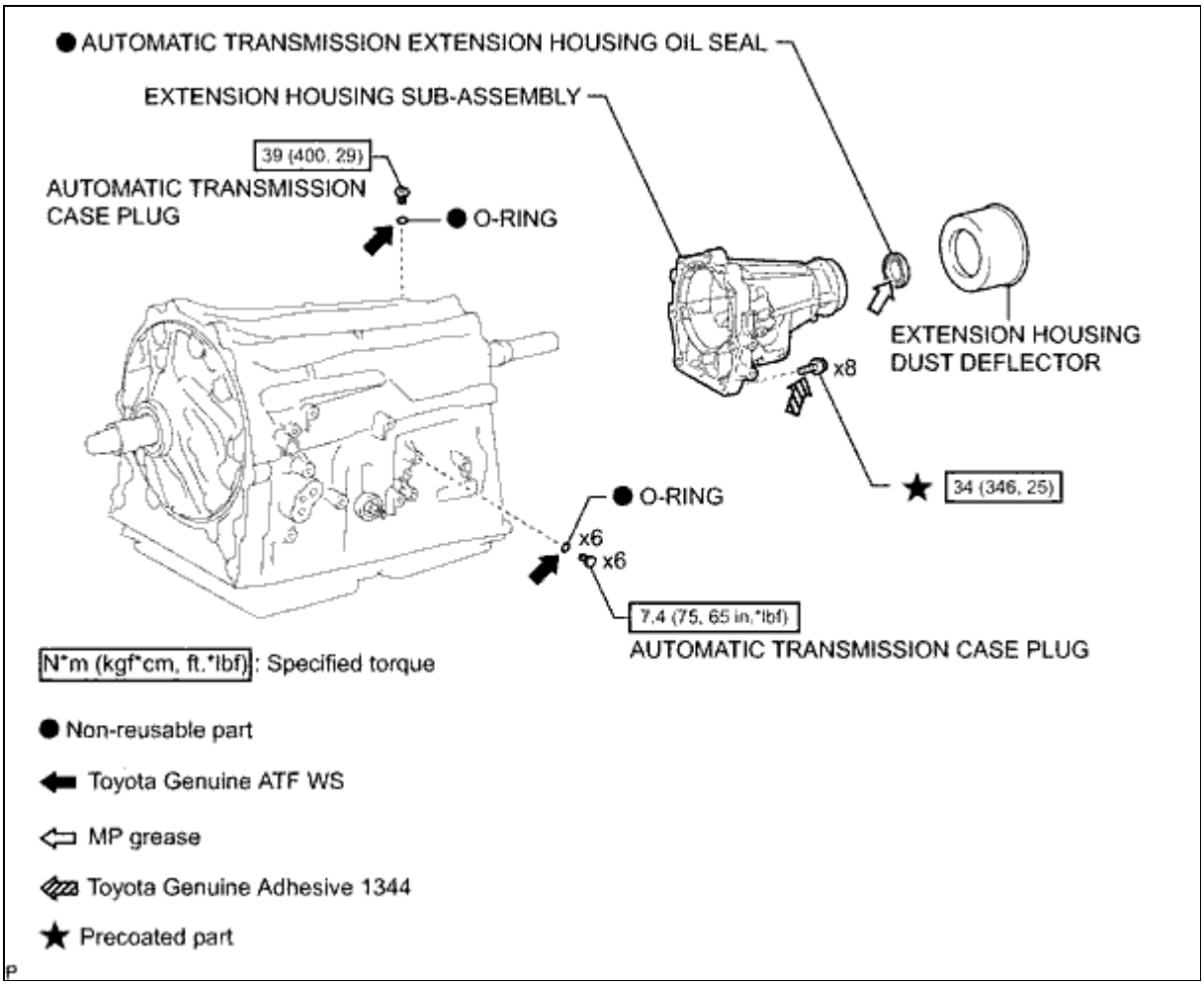
COMPONENTS

ILLUSTRATION



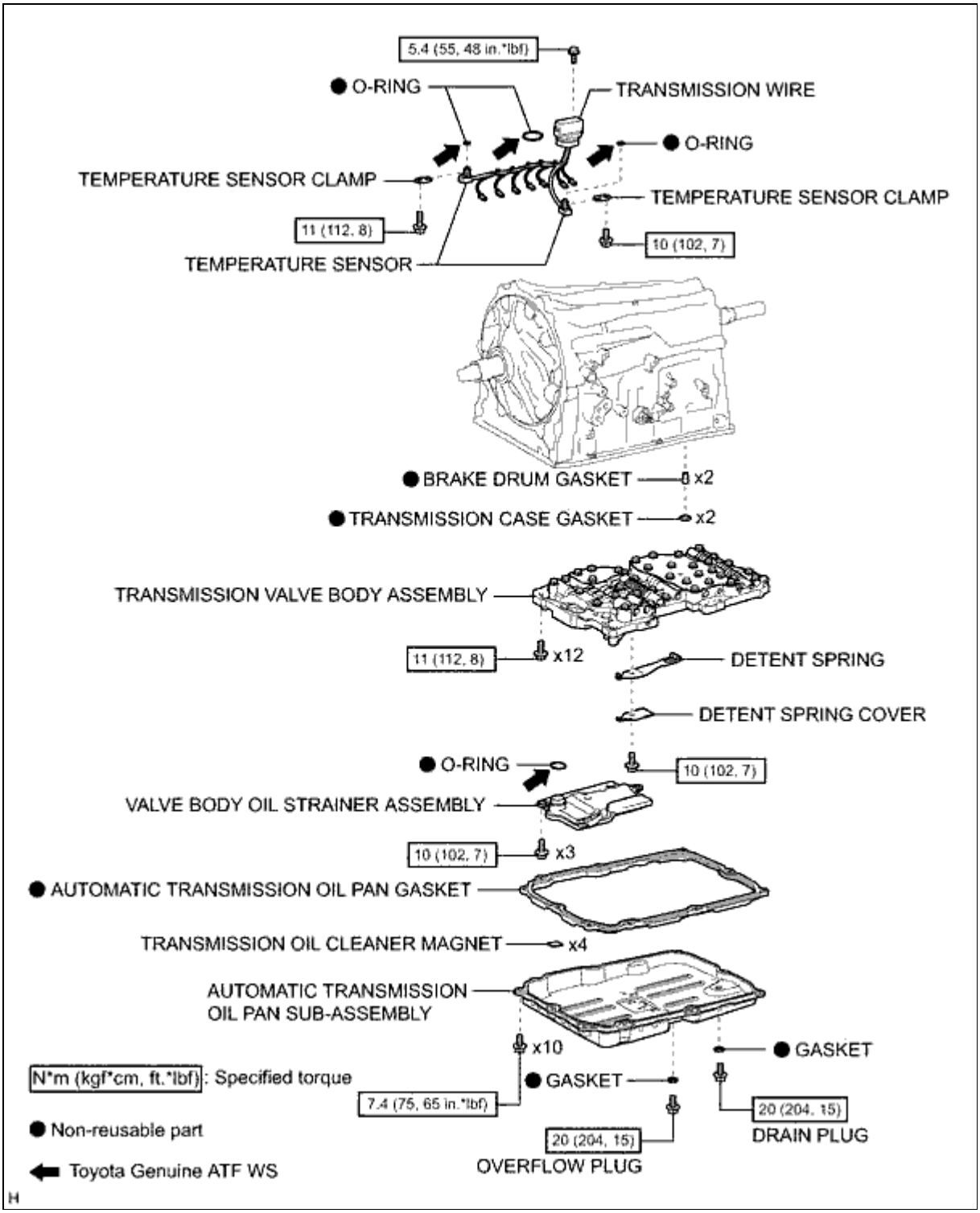
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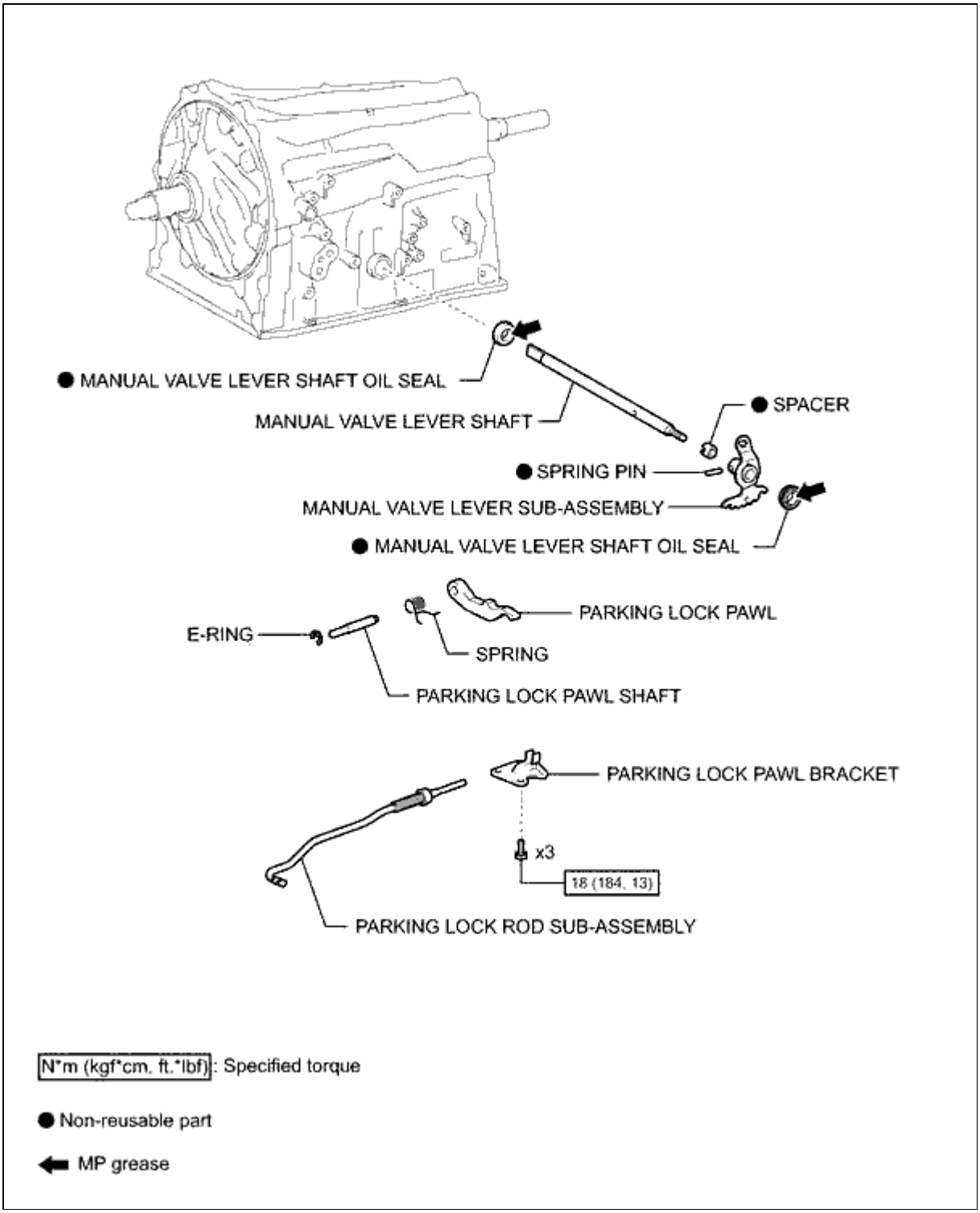
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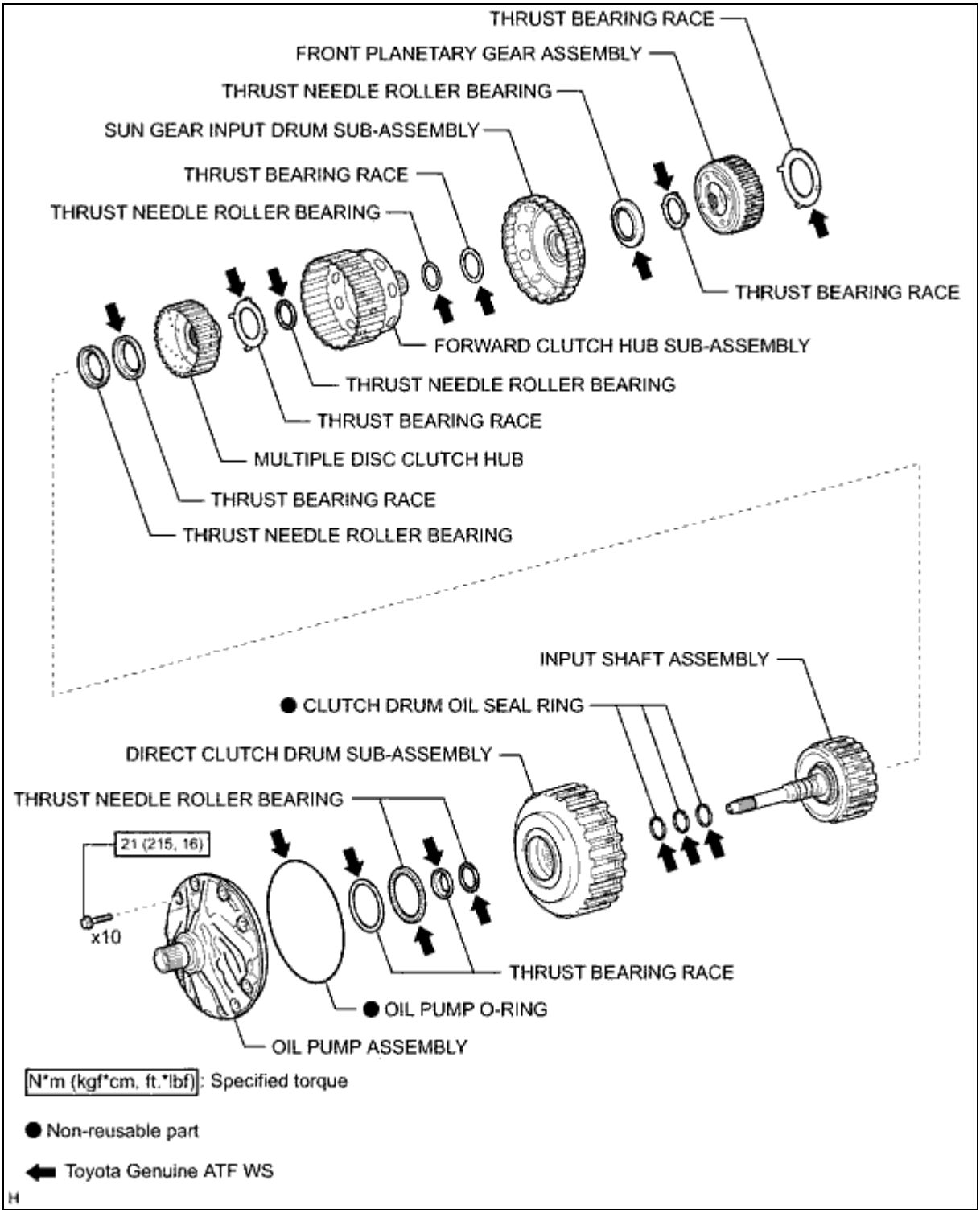
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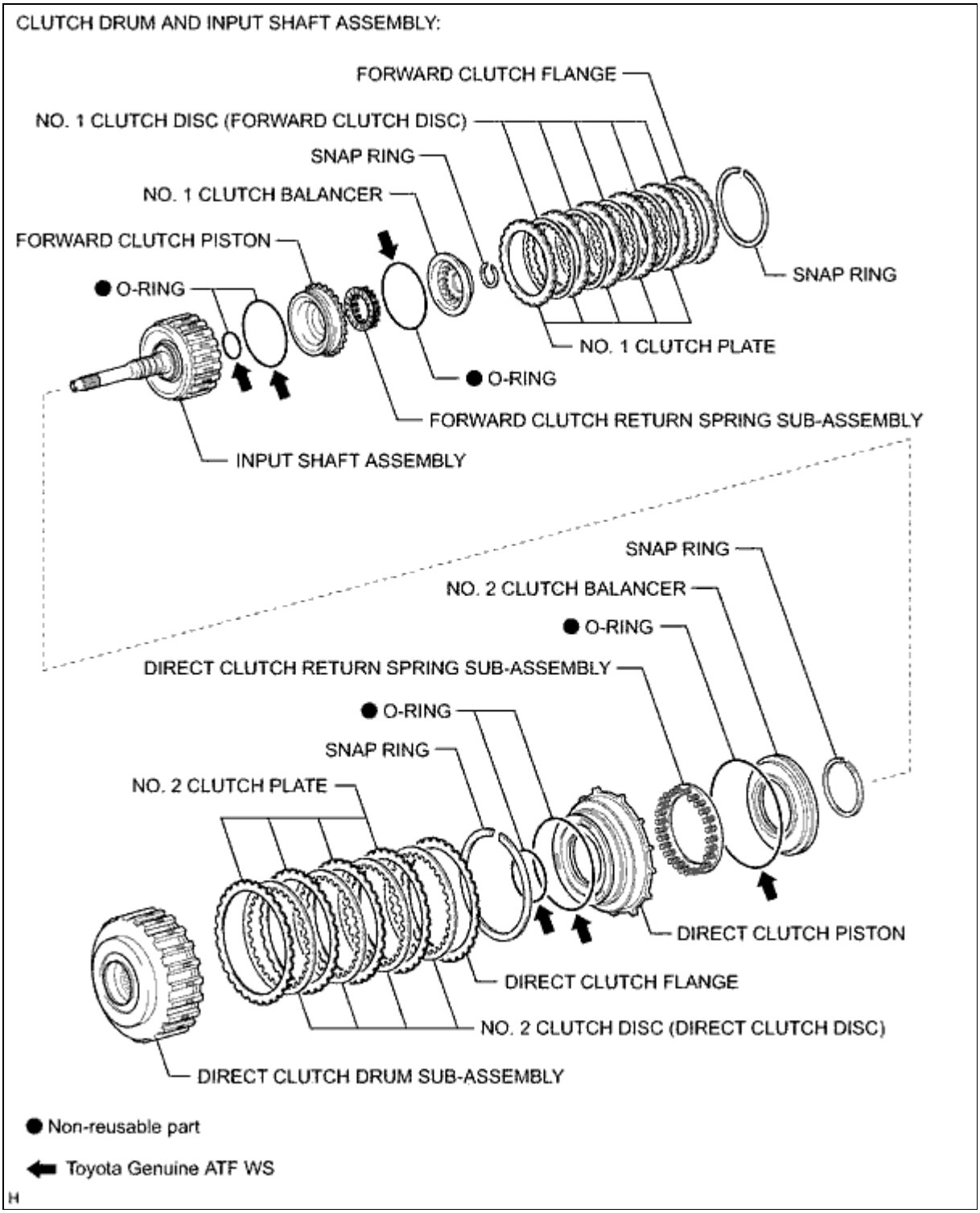
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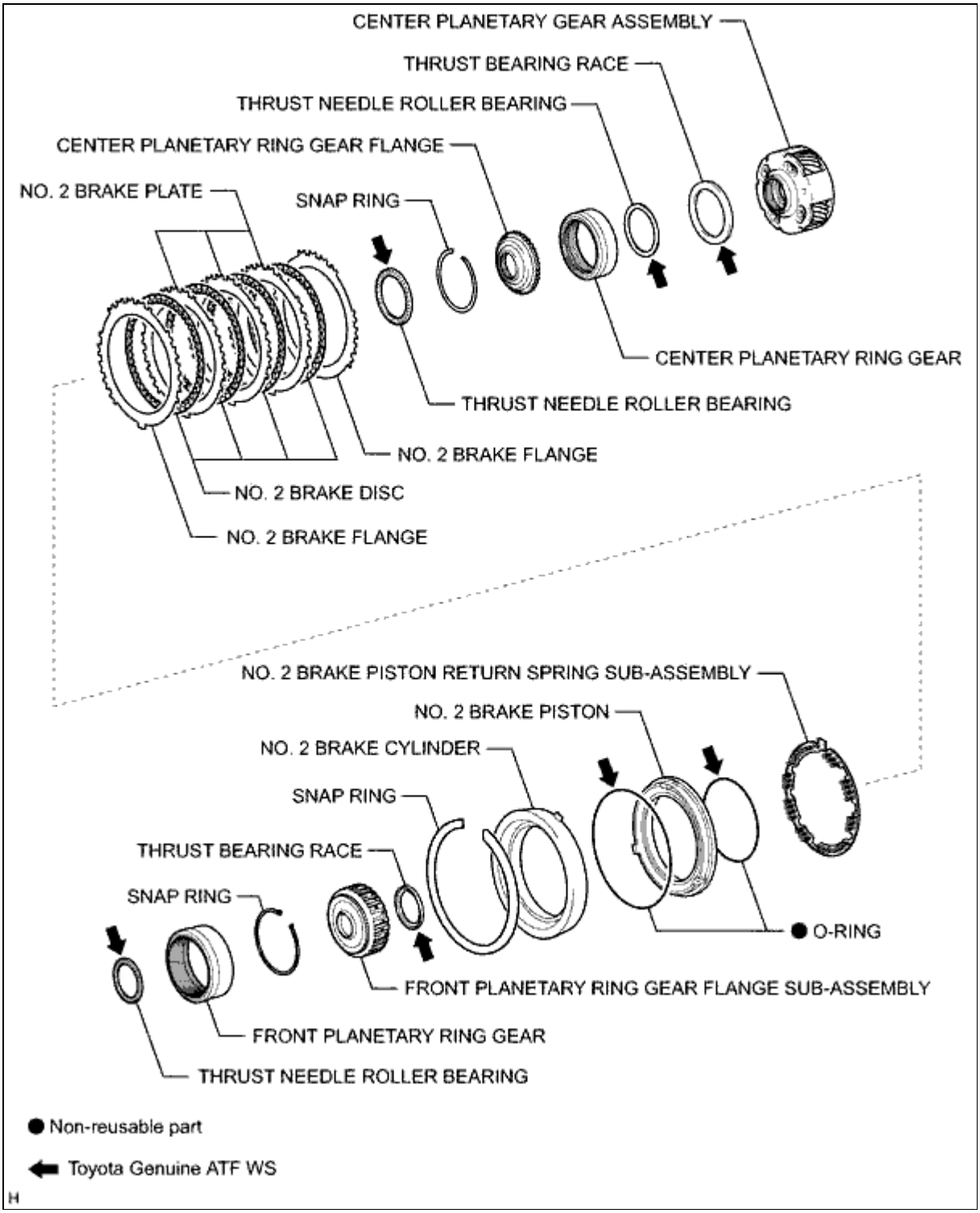
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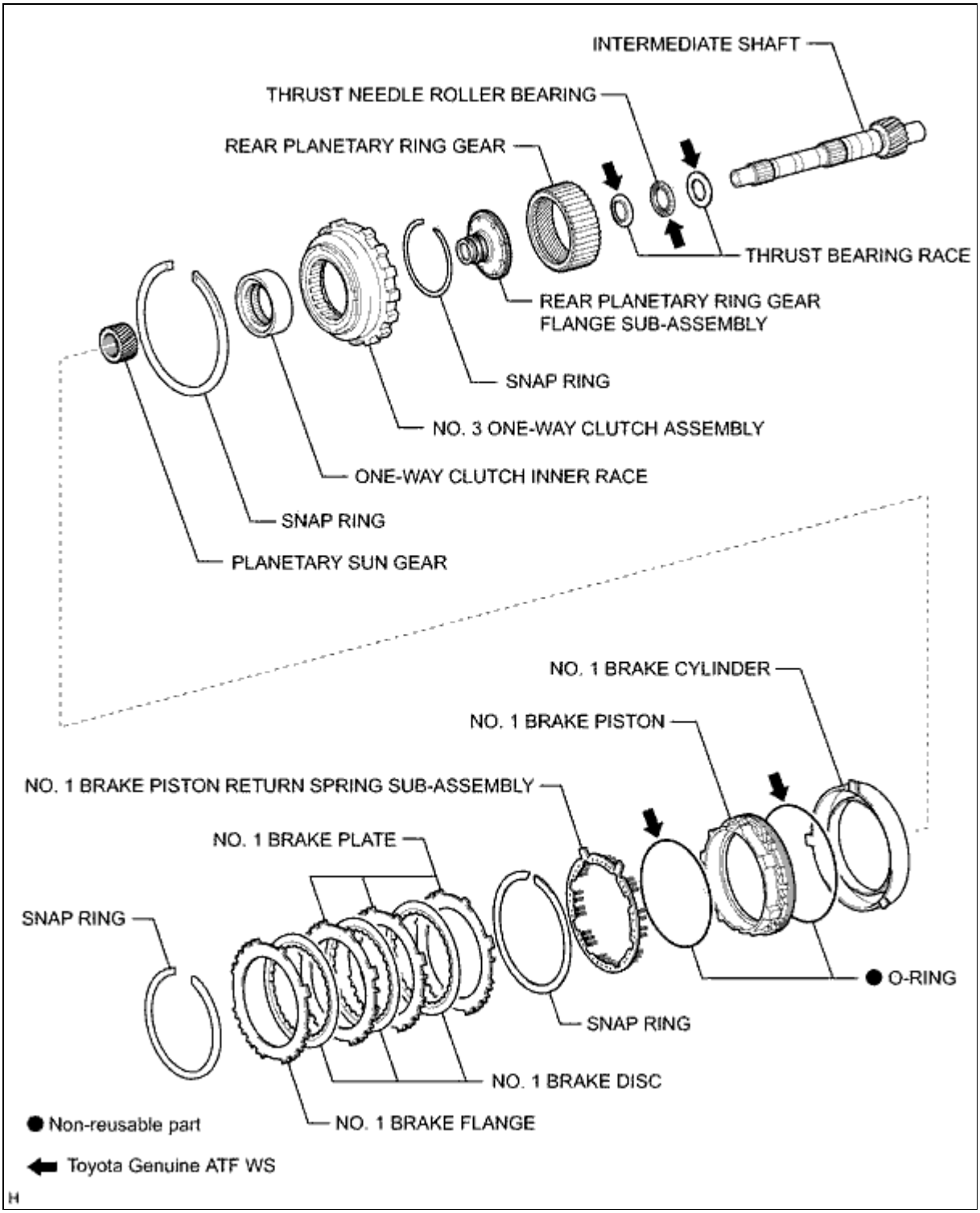
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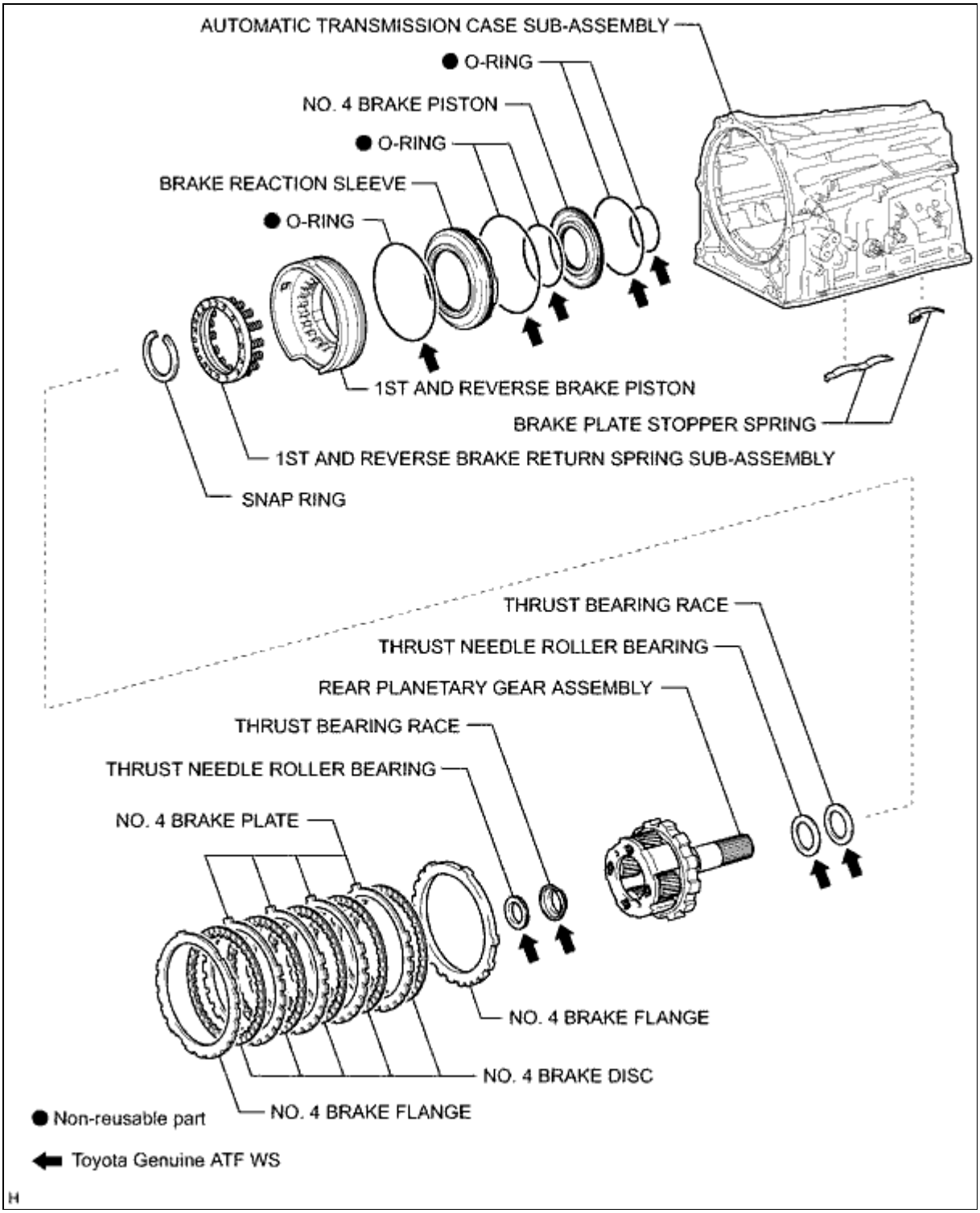
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ILLUSTRATION

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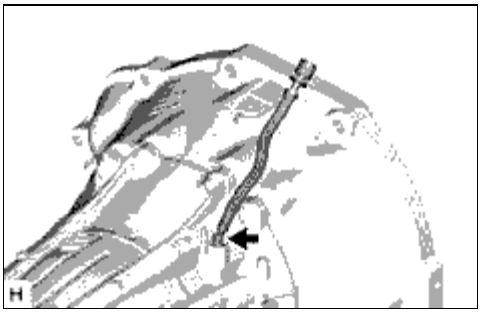
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9Z04YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. REMOVE BREATHER PLUG HOSE

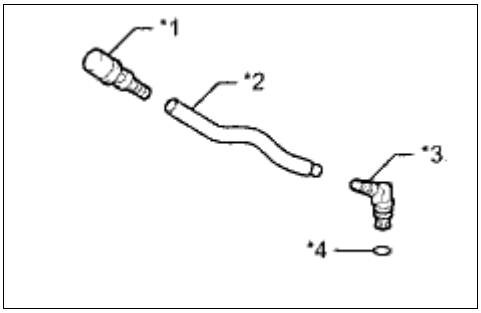
(a) Remove the breather plug hose from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the breather plug.

Text in Illustration

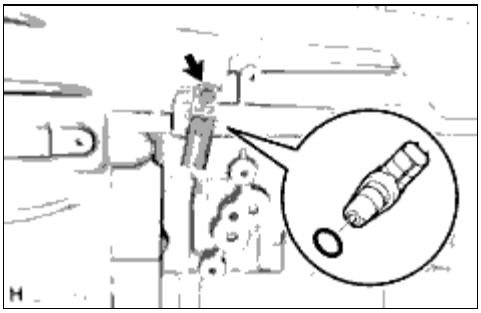
*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring



(c) Remove the breather plug sub-assembly and breather plug from the breather plug hose.

2. REMOVE TRANSMISSION REVOLUTION SENSOR

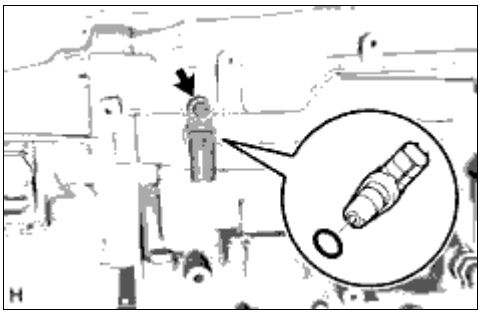
(a) Remove the bolt and transmission revolution sensor (NT) from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the transmission revolution sensor (NT).

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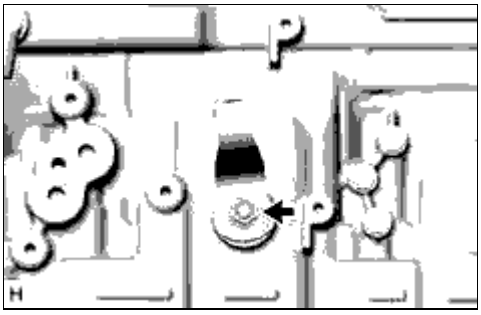
(c) Remove the bolt and transmission revolution sensor (SP2) from the automatic transmission case sub-assembly.



(d) Remove the O-ring from the transmission revolution sensor (SP2).

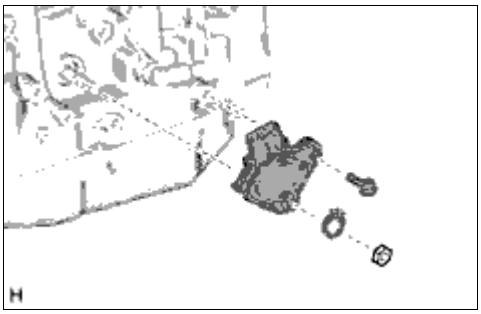
3. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH

(a) Remove the nut, spring washer and transmission control shaft lever LH from the manual valve lever shaft.



4. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Using a screwdriver, bend the tabs of the lock washer.



(b) Remove the nut and the lock washer.

(c) Remove the bolt and park/neutral position switch from the automatic transmission case sub-assembly.

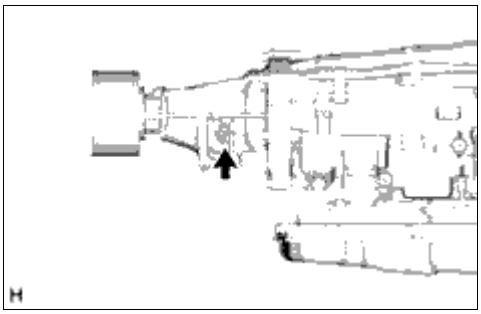
HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

5. REMOVE REFILL PLUG

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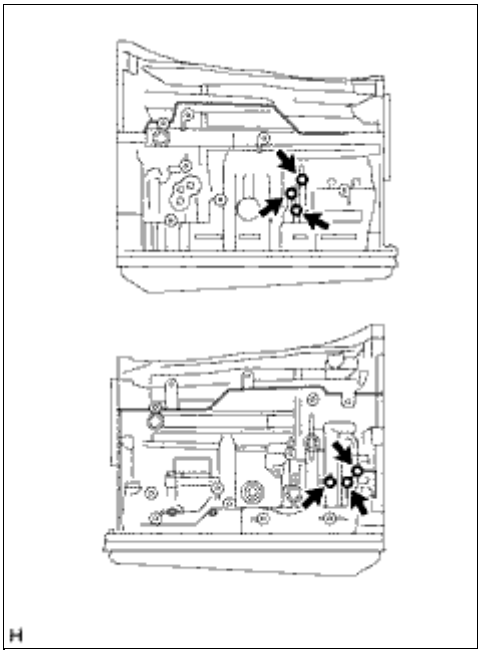
(a) Remove the refill plug from the extension housing sub-assembly.



(b) Remove the O-ring from the refill plug.

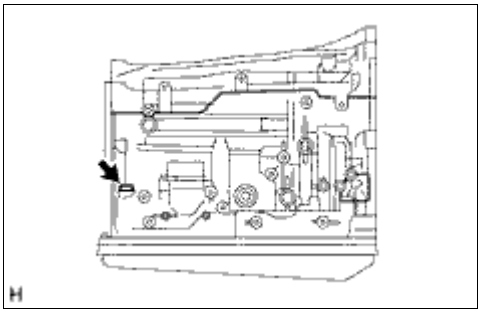
6. REMOVE AUTOMATIC TRANSMISSION CASE PLUG

(a) Remove the 6 automatic transmission case plugs from the automatic transmission case sub-assembly.



(b) Remove the 6 O-rings from the 6 automatic transmission case plugs.

(c) Using a T55 "TORX" socket wrench, remove the automatic transmission case plug from the automatic transmission case sub-assembly.

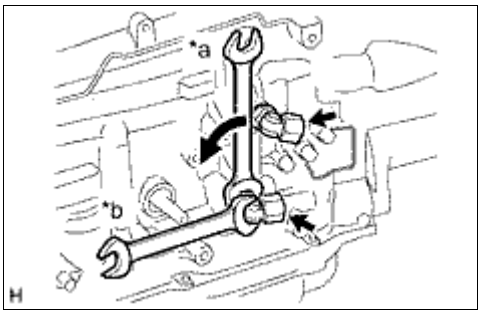


(d) Remove the O-ring from the automatic transmission case plug.

7. REMOVE OIL COOLER TUBE UNION

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(a) Remove the 2 oil cooler tube unions from the automatic transmission case sub-assembly.



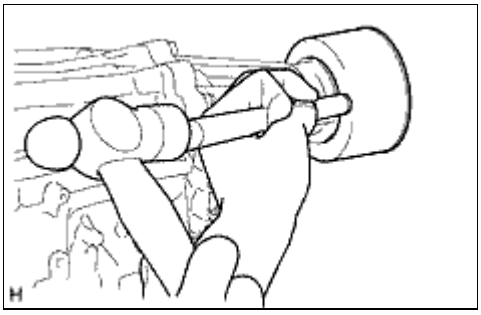
Text in Illustration

*a	Turn
*b	Hold

(b) Remove the 2 O-rings from the 2 oil cooler tube unions.

8. REMOVE EXTENSION HOUSING DUST DEFLECTOR

(a) Using a brass bar and hammer, tap out the extension housing dust deflector from the extension housing sub-assembly.

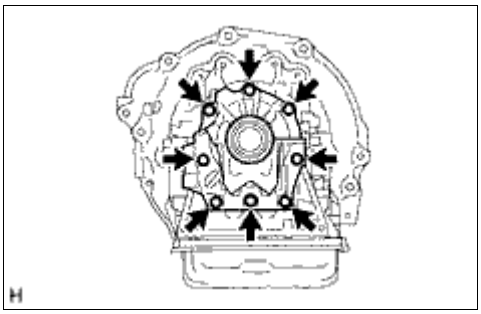


NOTICE:

Be careful not to damage the extension housing sub-assembly.

9. REMOVE EXTENSION HOUSING SUB-ASSEMBLY

(a) Remove the 8 bolts and extension housing sub-assembly from the automatic transmission case sub-assembly.

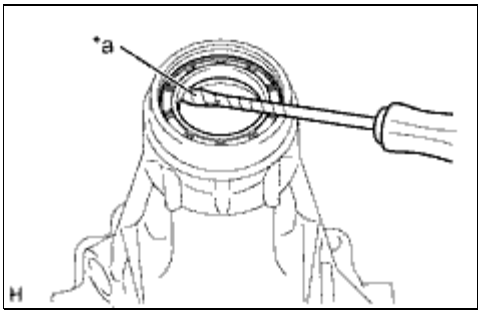


HINT:

Use a brass bar and hammer to remove the extension housing sub-assembly.

10. REMOVE AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

(a) Using a screwdriver, pry out the automatic transmission extension housing oil seal from the extension housing sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the extension housing sub-assembly.

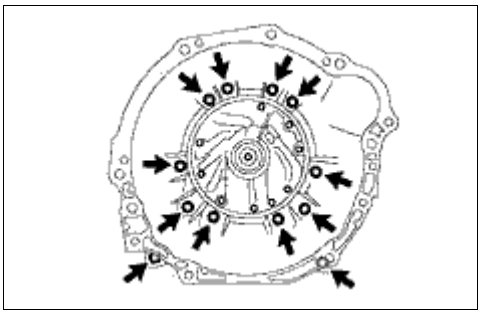
HINT:

Tape the screwdriver tip before use.

11. REMOVE AUTOMATIC TRANSMISSION HOUSING

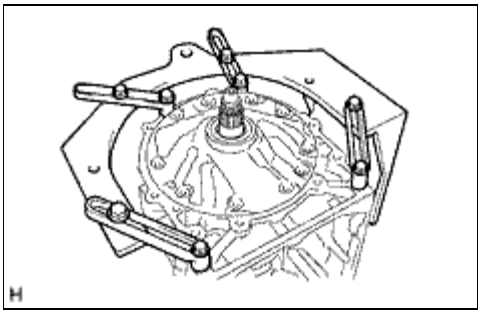
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(a) Remove the 12 bolts and automatic transmission housing from the automatic transmission case sub-assembly.



12. SECURE AUTOMATIC TRANSMISSION CASE SUB-ASSEMBLY

(a) Install the automatic transmission case sub-assembly to an overhaul attachment.



13. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

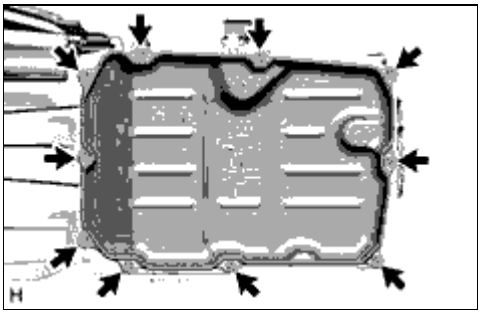
NOTICE:

Do not turn the transmission over as this will contaminate the transmission valve body assembly with foreign matter located at the bottom of the automatic transmission oil pan sub-assembly.

(a) Using a 5 mm socket hexagon wrench, remove the overflow plug and gasket.

(b) Remove the drain plug and gasket.

(c) Remove the 10 bolts, automatic transmission oil pan sub-assembly and automatic transmission oil pan gasket.



(d) Remove the 4 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

(e) Examine the particles in the automatic transmission oil pan sub-assembly.

(1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.

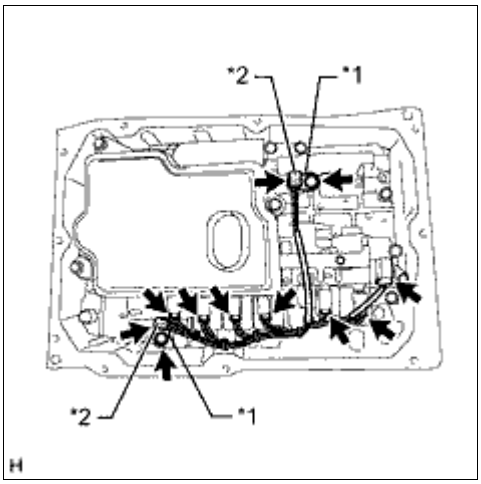
Steel (magnetic): bearing, gear and clutch plate wear

Brass (non-magnetic): bush wear

14. REMOVE TRANSMISSION WIRE

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(a) Remove the 2 bolts and 2 temperature sensor clamps, and disconnect the 2 temperature sensors.

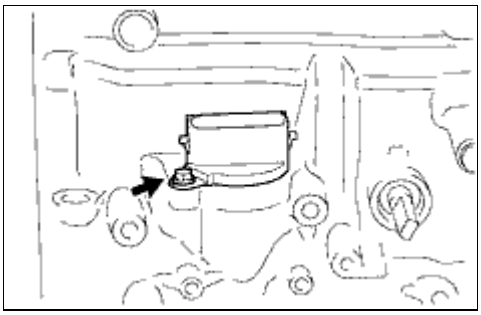


Text in Illustration

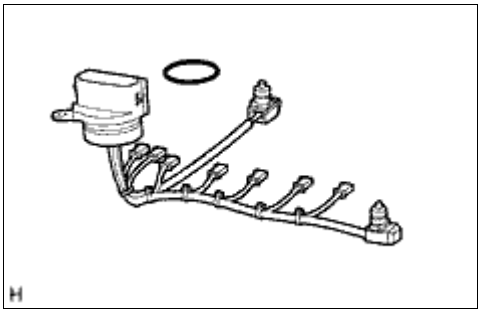
*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Disconnect the 7 solenoid valve connectors and transmission wire from the transmission valve body assembly.

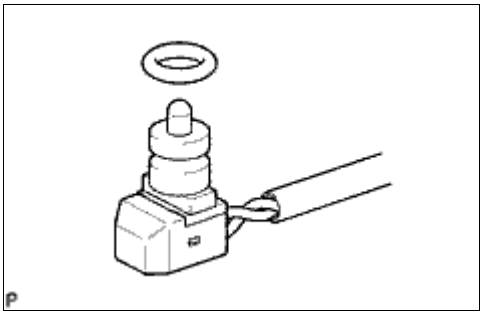
(c) Remove the bolt and pull out the transmission wire from the automatic transmission case sub-assembly.



(d) Remove the O-ring from the connector of transmission wire.



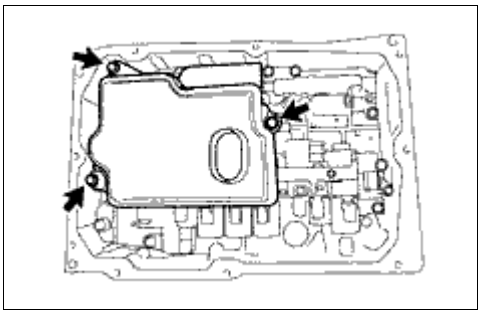
(e) Remove the 2 O-rings from the 2 temperature sensors.



15. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

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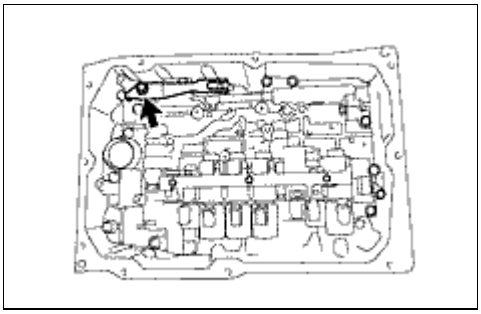
(a) Remove the 3 bolts and valve body oil strainer assembly from the transmission valve body assembly.



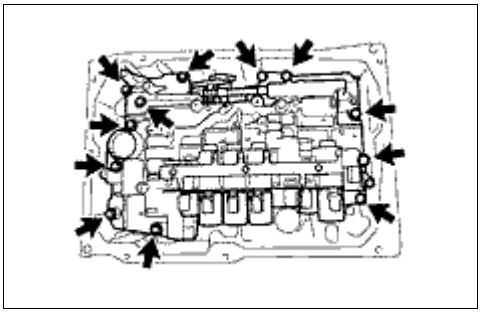
(b) Remove the O-ring from the valve body oil strainer assembly.

16. REMOVE TRANSMISSION VALVE BODY ASSEMBLY

(a) Remove the bolt, detent spring cover and detent spring from the transmission valve body assembly.

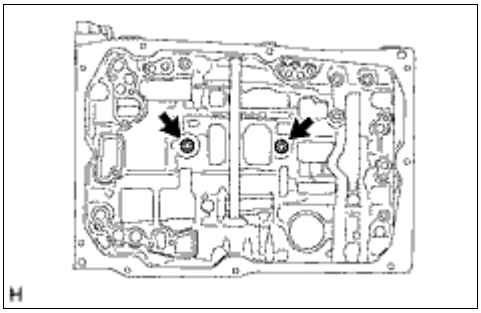


(b) Remove the 12 bolts and transmission valve body assembly from the automatic transmission case sub-assembly.



17. REMOVE TRANSMISSION CASE GASKET

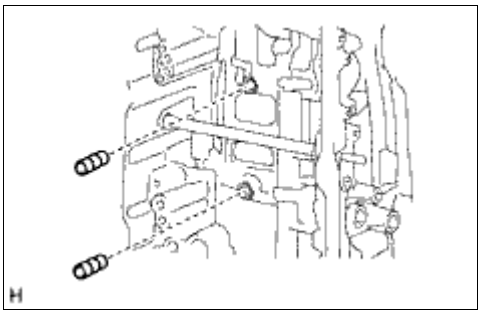
(a) Remove the 2 transmission case gaskets from the automatic transmission case sub-assembly.



18. REMOVE BRAKE DRUM GASKET

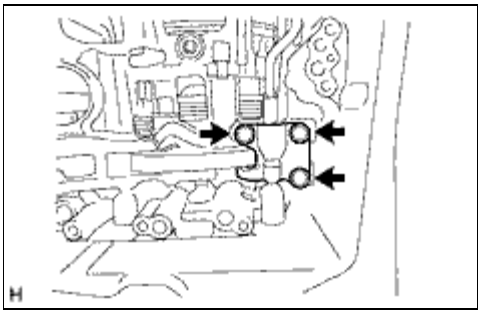
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(a) Remove the 2 brake drum gaskets from the automatic transmission case sub-assembly.



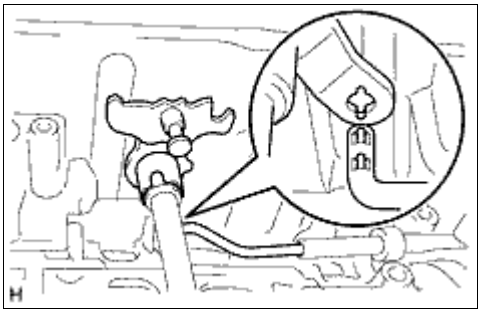
19. REMOVE PARKING LOCK PAWL BRACKET

(a) Remove the 3 bolts and parking lock pawl bracket from the automatic transmission case sub-assembly.



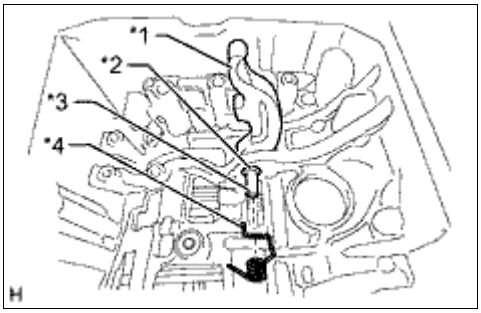
20. REMOVE PARKING LOCK ROD SUB-ASSEMBLY

(a) Remove the parking lock rod sub-assembly from the manual valve lever sub-assembly.



21. REMOVE PARKING LOCK PAWL SHAFT

(a) Pull out the parking lock pawl shaft from the front side, and remove the parking lock pawl and spring.



Text in Illustration

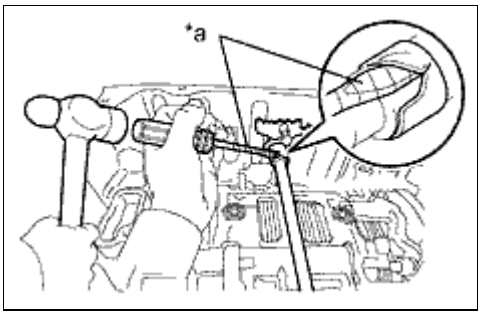
*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring

(b) Remove the E-ring from the parking lock pawl shaft.

22. REMOVE MANUAL VALVE LEVER SUB-ASSEMBLY

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(a) Using a screwdriver and hammer, cut off the spacer and remove it from the manual valve lever shaft.



Text in Illustration

*a	Protective Tape

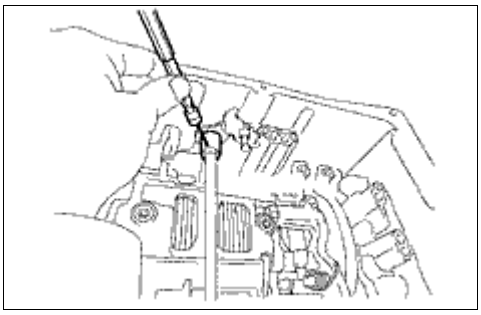
NOTICE:

Be careful not to damage the manual valve lever shaft.

HINT:

Tape the screwdriver tip before use.

(b) Using a 3 mm pin punch and hammer, drive out the spring pin.



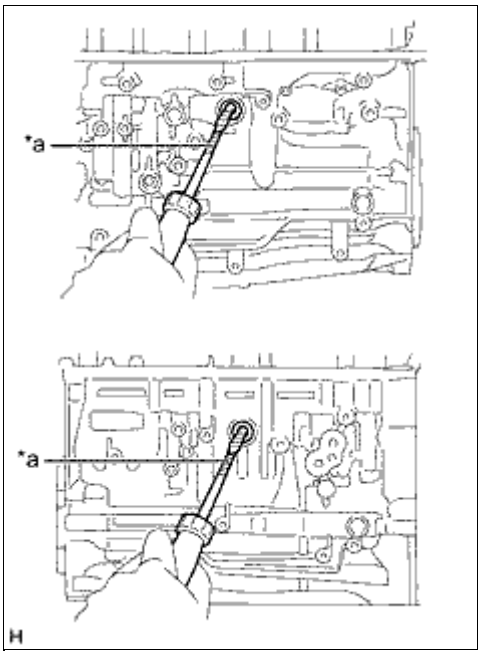
HINT:

Slowly drive out the spring pin so that it does not fall into the automatic transmission case sub-assembly.

(c) Pull the manual valve lever shaft out through the case and remove the manual valve lever sub-assembly.

23. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

(a) Using a screwdriver, pry out the 2 manual valve lever shaft oil seals from the automatic transmission case sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

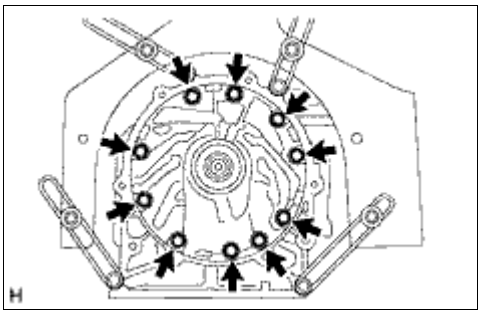
HINT:

Tape the screwdriver tip before use.

24. REMOVE OIL PUMP ASSEMBLY

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(a) Remove the 10 bolts.

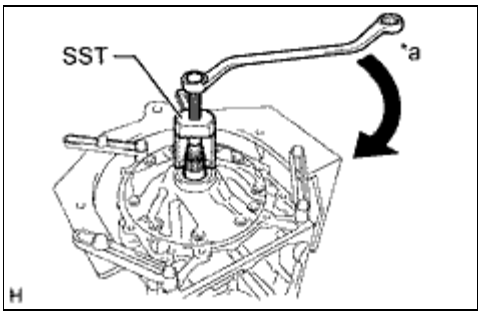


(b) Using SST, pull out the oil pump assembly from the automatic transmission case sub-assembly.

Text in Illustration

*a	Turn

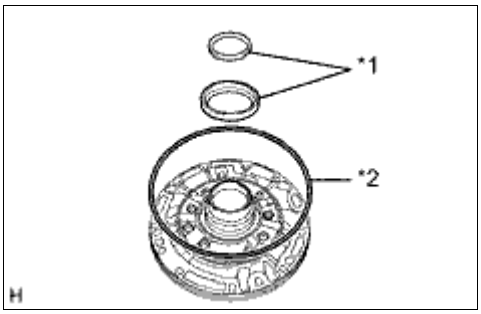
SST: 09610-20012



(c) Remove the 2 thrust bearing races from the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race
*2	Oil Pump O-ring



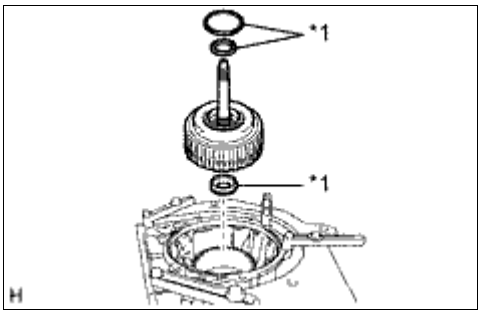
(d) Remove the oil pump O-ring from the oil pump assembly.

25. REMOVE CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

(a) Remove the clutch drum and input shaft assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing

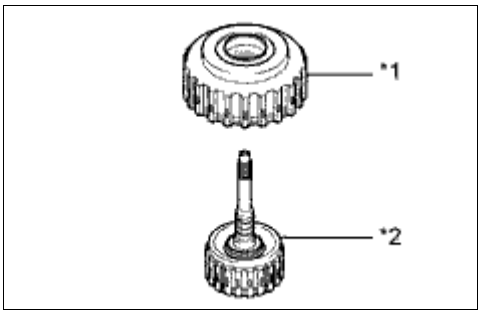


(b) Remove the 3 thrust needle roller bearings from the clutch drum and input shaft assembly.

26. REMOVE DIRECT CLUTCH DRUM SUB-ASSEMBLY

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(a) Remove the direct clutch drum sub-assembly from the input shaft sub-assembly.



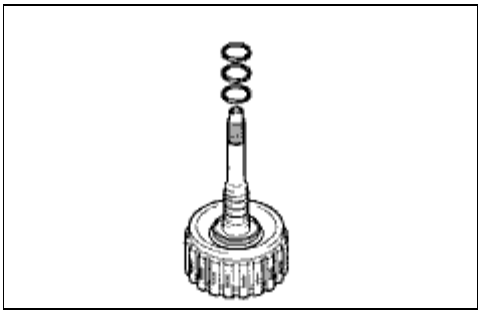
Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly

27. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH) INFO

28. REMOVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 3 clutch drum oil seal rings from the input shaft sub-assembly.



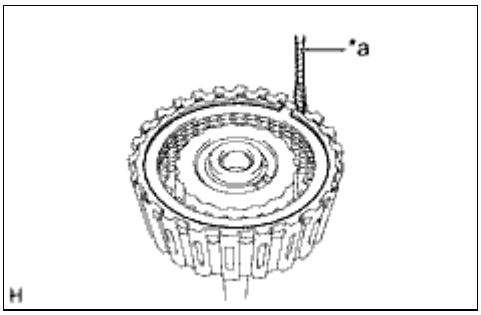
29. REMOVE NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Secure the input shaft sub-assembly in a vise between aluminum plates.

NOTICE:

Do not overtighten the vise.

(b) Using a screwdriver, remove the snap ring.



Text in Illustration

*a	Protective Tape

NOTICE:

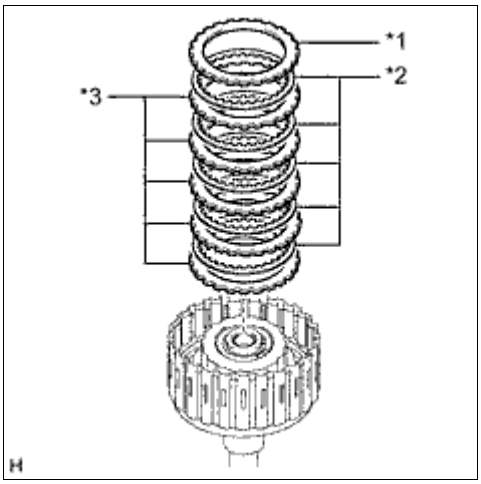
Be careful not to damage the input shaft sub-assembly.

HINT:

Tape the screwdriver tip before use.

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(c) Remove the forward clutch flange, 5 No. 1 clutch discs and 5 No. 1 clutch plates from the input shaft sub-assembly.



Text in Illustration

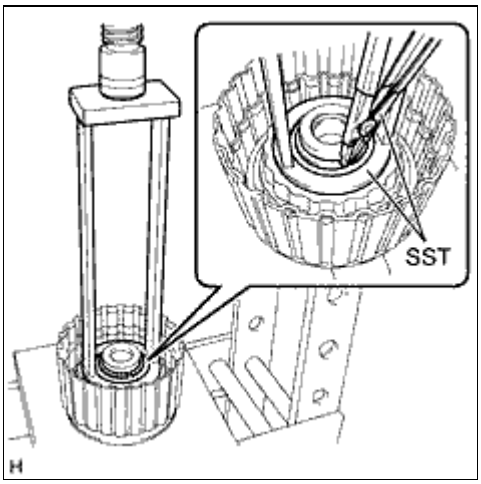
*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

30. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC) INFO

31. REMOVE NO. 1 CLUTCH BALANCER

(a) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110

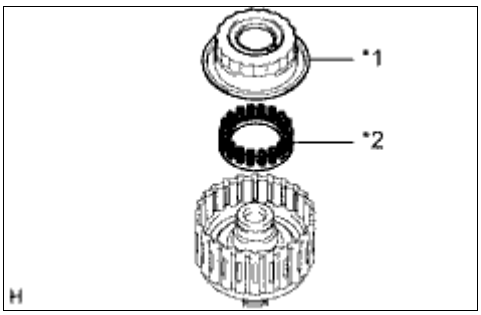


(b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070

(c) Remove the No. 1 clutch balancer and forward clutch return spring sub-assembly from the input shaft sub-assembly.



Text in Illustration

*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

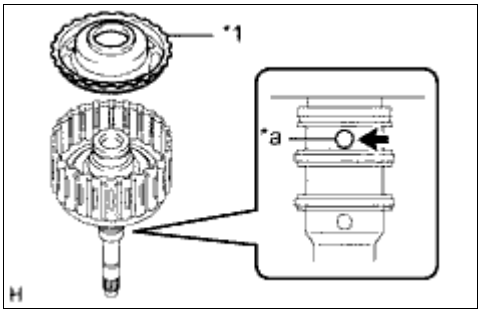
(d) Remove the O-ring from the No. 1 clutch balancer.

32. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

33. REMOVE FORWARD CLUTCH PISTON

cardiagn.com

(a) While holding the forward clutch piston, apply compressed air to the oil hole of the input shaft sub-assembly to remove the forward clutch piston from the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Piston
*a	Oil Hole

(b) Remove the O-ring from the forward clutch piston.

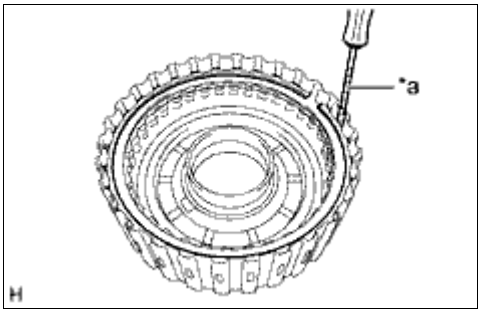
(c) Remove the O-ring from the input shaft sub-assembly.

34. INSPECT INPUT SHAFT SUB-ASSEMBLY INFO

35. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

36. REMOVE NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Using a screwdriver, remove the snap ring from the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

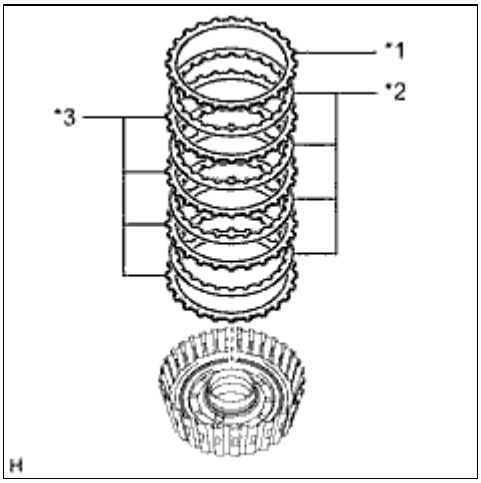
NOTICE:

Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

(b) Remove the direct clutch flange, 4 No. 2 clutch discs and 4 No. 2 clutch plates from the direct clutch drum sub-assembly.



Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

37. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC) INFO

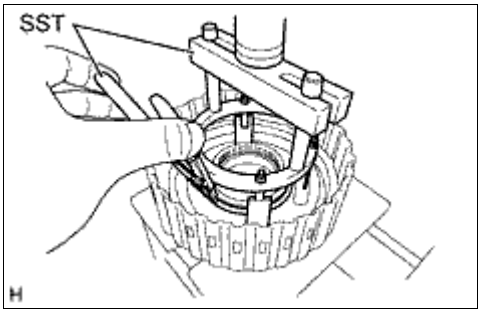
38. REMOVE NO. 2 CLUTCH BALANCER

cardiagn.com

(a) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110



(b) Using SST, remove the snap ring.

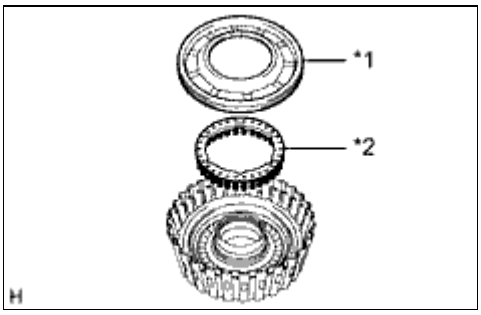
SST: 09350-30020

09350-07070

(c) Remove the No. 2 clutch balancer and direct clutch return spring sub-assembly from the direct clutch drum sub-assembly.

Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly



(d) Remove the O-ring from the No. 2 clutch balancer.

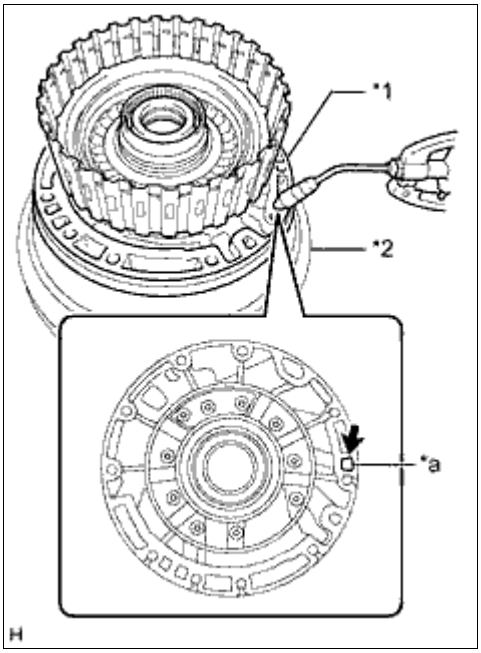
39. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

40. REMOVE DIRECT CLUTCH PISTON

(a) Place the oil pump assembly onto the torque converter assembly, and then place the direct clutch drum sub-assembly onto the oil pump assembly.

Text in Illustration

*1	Oil Pump Assembly
*2	Torque Converter Assembly
*a	Oil Hole



(b) While holding the direct clutch piston, apply compressed air to the oil hole of the oil pump assembly to remove the direct clutch piston from the direct clutch drum sub-assembly.

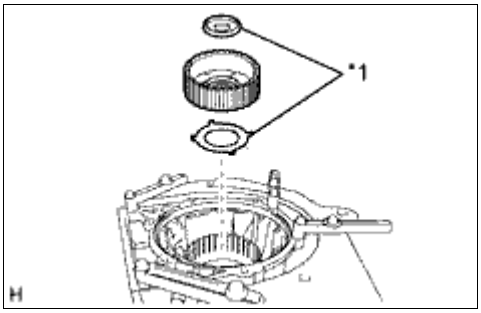
(c) Remove the 2 O-rings from the direct clutch piston.

cardiagn.com

41. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY INFO

42. REMOVE MULTIPLE DISC CLUTCH HUB

(a) Remove the multiple disc clutch hub from the automatic transmission case sub-assembly.



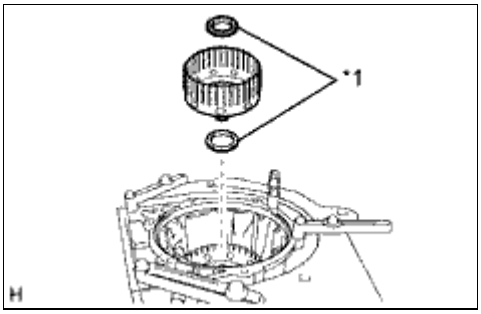
Text in Illustration

*1	Thrust Bearing Race

(b) Remove the 2 thrust bearing races from the multiple disc clutch hub.

43. REMOVE FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Remove the forward clutch hub sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

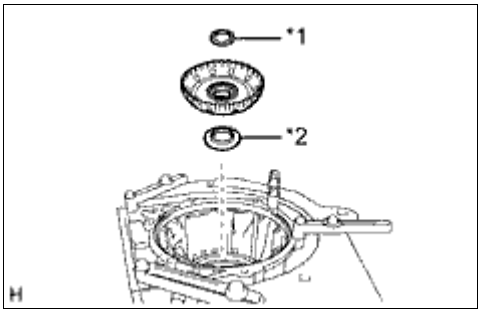
*1	Thrust Needle Roller Bearing

(b) Remove the 2 thrust needle roller bearings from the forward clutch hub sub-assembly.

44. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY INFO

45. REMOVE SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Remove the sun gear input drum sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

*1	Thrust Bearing Race
*2	Thrust Needle Roller Bearing

(b) Remove the thrust needle roller bearing and thrust bearing race from the sun gear input drum sub-assembly.

46. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY INFO

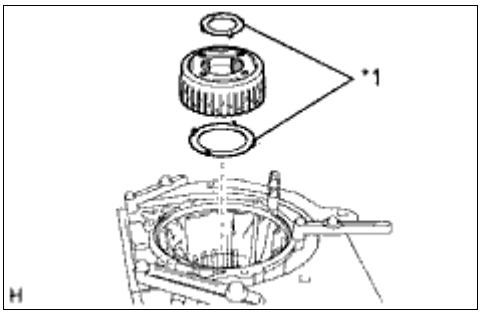
47. REMOVE FRONT PLANETARY GEAR ASSEMBLY

cardiagn.com

(a) Remove the front planetary gear assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race



(b) Remove the 2 thrust bearing races from the front planetary gear assembly.

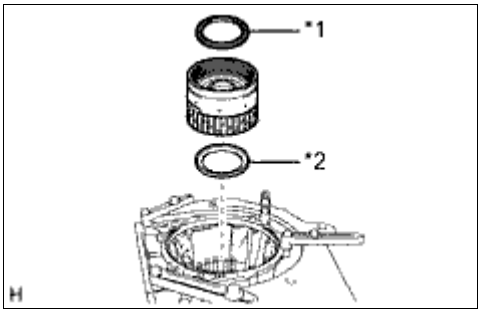
48. INSPECT FRONT PLANETARY GEAR ASSEMBLY INFO

49. REMOVE FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Remove the front planetary ring gear with front planetary ring gear flange sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race



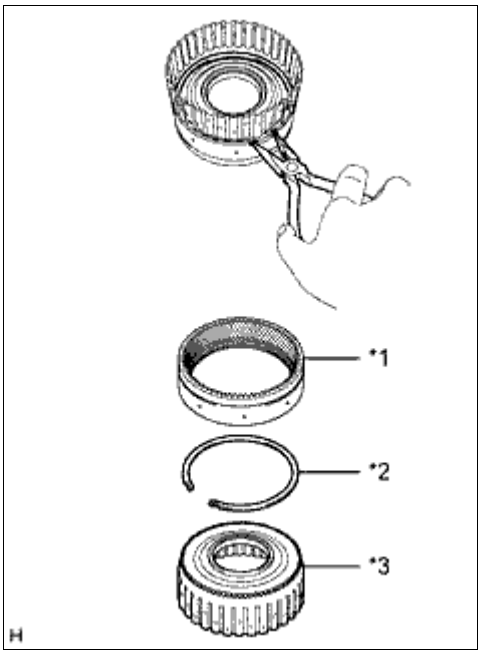
(b) Remove the thrust needle roller bearing and thrust bearing race from the front planetary ring gear with front planetary ring gear flange sub-assembly.

50. REMOVE FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using needle-nose pliers, remove the snap ring and front planetary ring gear flange sub-assembly from the front planetary ring gear.

Text in Illustration

*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly



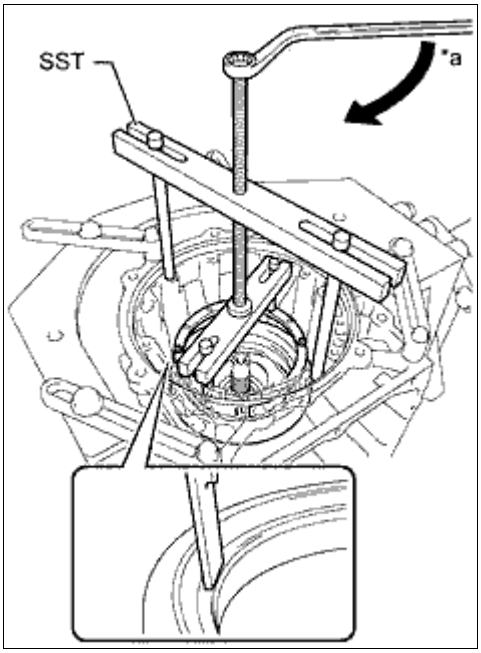
51. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

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52. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

53. REMOVE NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06020
09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

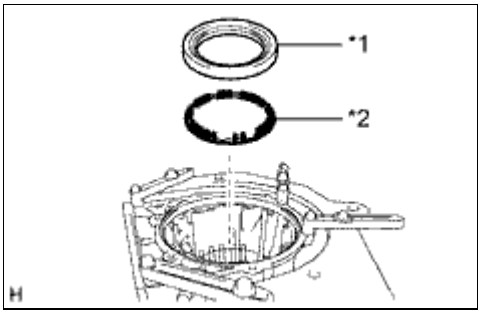
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(c) Remove the No. 2 brake cylinder with No. 2 brake piston and No. 2 brake piston return spring sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

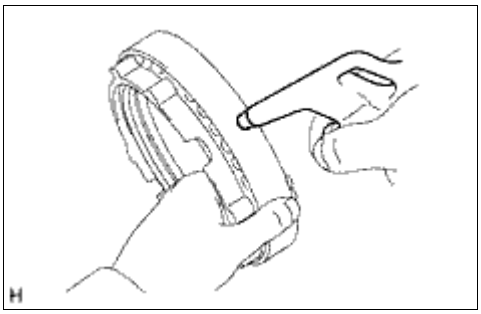
*1	No. 2 Brake Cylinder with No. 2 Brake Piston
*2	No. 2 Brake Piston Return Spring Sub-assembly

54. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

55. REMOVE NO. 2 BRAKE PISTON

cardiagn.com

(a) While holding the No. 2 brake piston, apply compressed air to the oil hole of the No. 2 brake cylinder to remove the No. 2 brake piston from the No. 2 brake cylinder.



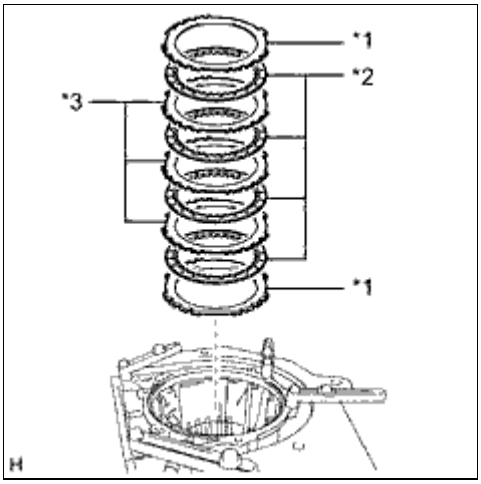
(b) Remove the 2 O-rings from the No. 2 brake piston.

56. REMOVE NO. 2 BRAKE DISC

(a) Remove the 2 No. 2 brake flanges, 4 No. 2 brake discs and 3 No. 2 brake plates from the automatic transmission case sub-assembly.

Text in Illustration

*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate



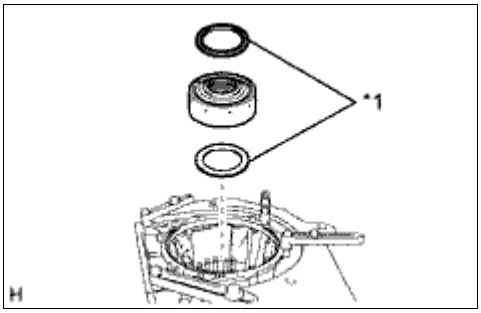
57. INSPECT NO. 2 BRAKE DISC INFO

58. REMOVE CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

(a) Remove the center planetary ring gear flange with center planetary ring gear from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing



(b) Remove the 2 thrust needle roller bearings from the center planetary ring gear flange with center planetary ring gear.

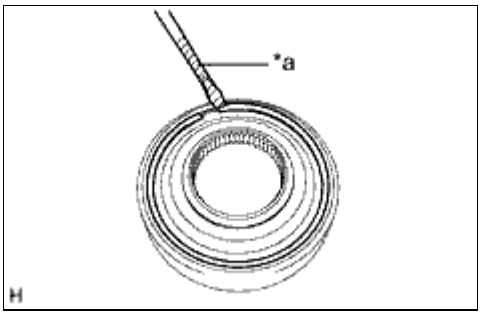
59. REMOVE CENTER PLANETARY RING GEAR

cardiagn.com

(a) Using a screwdriver, remove the snap ring from the center planetary ring gear flange with center planetary ring gear.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

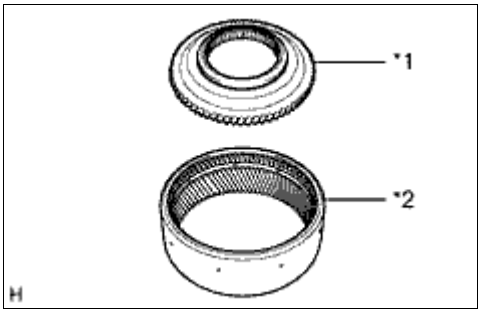
HINT:

Tape the screwdriver tip before use.

(b) Remove the center planetary ring gear from the center planetary ring gear flange.

Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

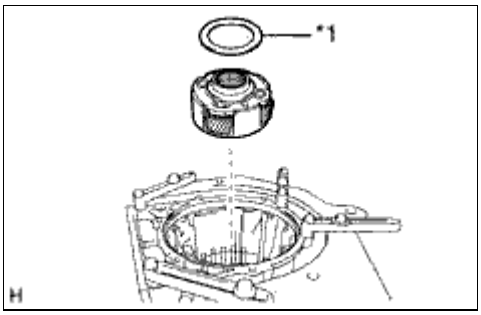


60. REMOVE CENTER PLANETARY GEAR ASSEMBLY

(a) Remove the center planetary gear assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race

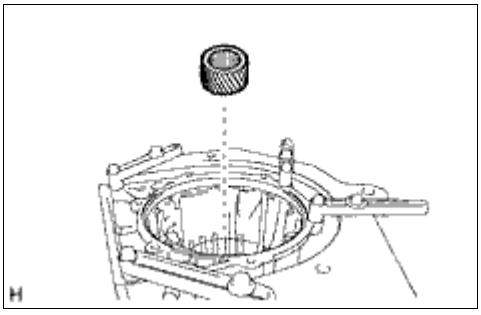


(b) Remove the thrust bearing race from the center planetary gear assembly.

61. INSPECT CENTER PLANETARY GEAR ASSEMBLY INFO

62. REMOVE PLANETARY SUN GEAR

(a) Remove the planetary sun gear from the automatic transmission case sub-assembly.

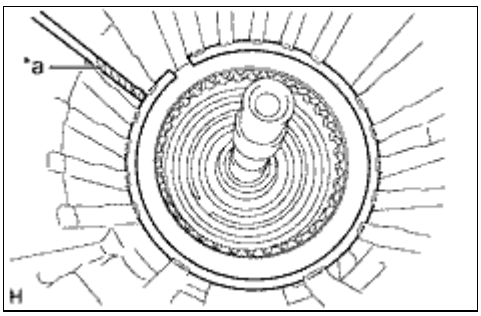


63. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

cardiagn.com

64. REMOVE NO. 1 BRAKE DISC

(a) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.



Text in Illustration

*a	Protective Tape

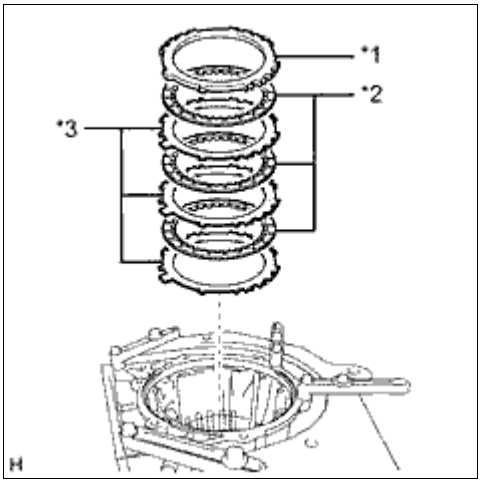
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(b) Remove the No. 1 brake flange, 3 No. 1 brake discs and 3 No. 1 brake plates from the automatic transmission case sub-assembly.



Text in Illustration

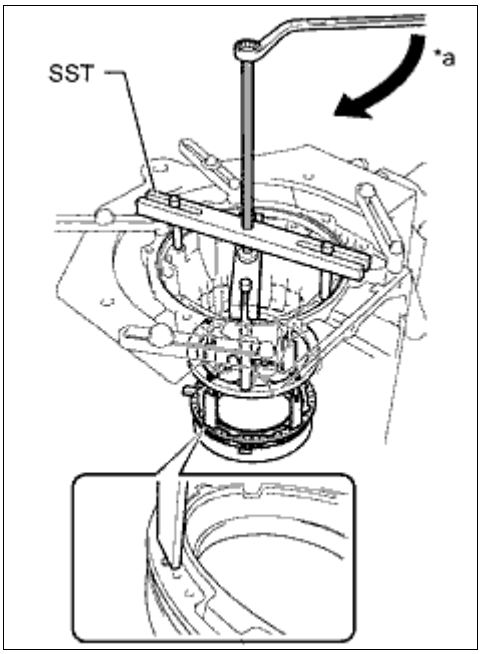
*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

65. INSPECT NO. 1 BRAKE DISC INFO

66. REMOVE NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

cardiagn.com

(a) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06040
09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

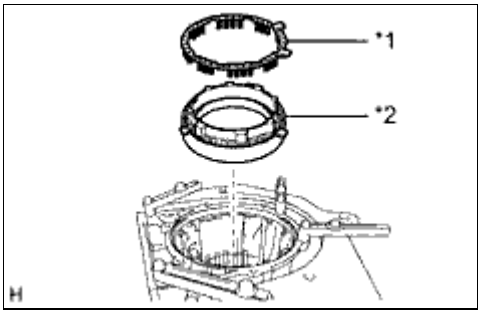
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(c) Remove the No. 1 brake piston return spring sub-assembly and No. 1 brake cylinder with No. 1 brake piston from the automatic transmission case sub-assembly.



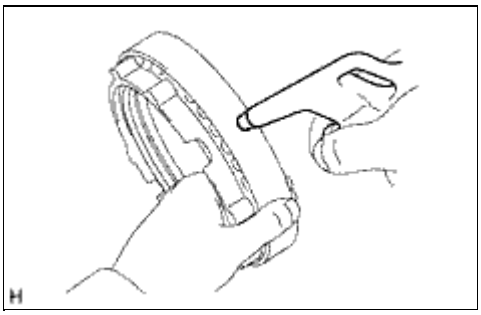
Text in Illustration

*1	No. 1 Brake Piston Return Spring Sub-assembly
*2	No. 1 Brake Cylinder with No. 1 Brake Piston

67. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

68. REMOVE NO. 1 BRAKE PISTON

(a) While holding the No. 1 brake piston, apply compressed air to the oil hole of the No. 1 brake cylinder to remove the No. 1 brake piston from the No. 1 brake cylinder.



(b) Remove the 2 O-rings from the No. 1 brake piston.

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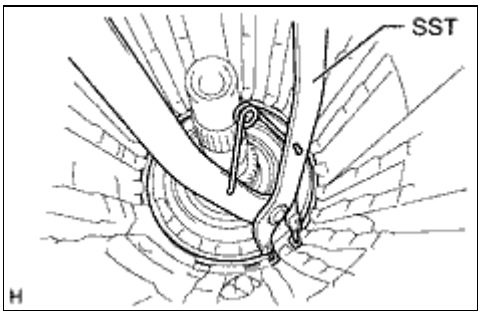
69. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

70. REMOVE INTERMEDIATE SHAFT WITH NO. 3 ONE-WAY CLUTCH ASSEMBLY AND REAR PLANETARY RING GEAR

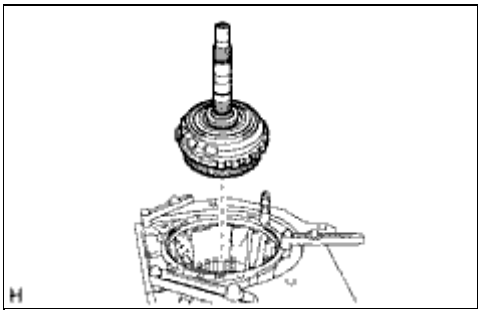
(a) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07060



(b) Remove the intermediate shaft with No. 3 one-way clutch assembly and rear planetary ring gear from the automatic transmission case sub-assembly.



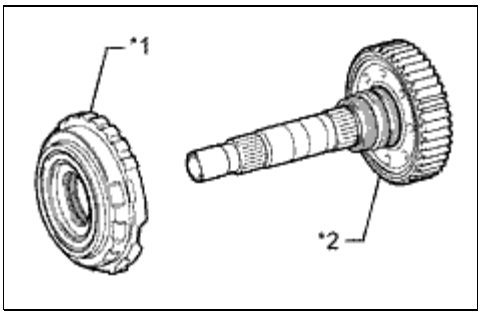
71. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY INFO

72. REMOVE NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Remove the No. 3 one-way clutch assembly with one-way clutch inner race from the intermediate shaft with rear planetary ring gear.

Text in Illustration

*1	No. 3 One-way Clutch Assembly with One-way Clutch Inner Race
*2	Intermediate Shaft with Rear Planetary Ring Gear

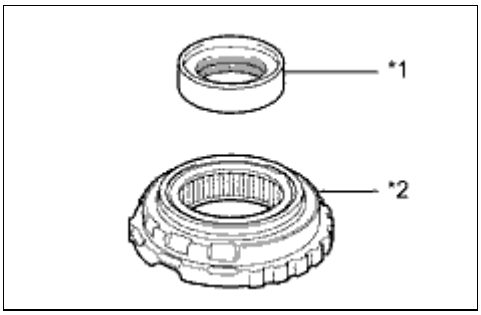


73. REMOVE ONE-WAY CLUTCH INNER RACE

(a) Remove the one-way clutch inner race from the No. 3 one-way clutch assembly.

Text in Illustration

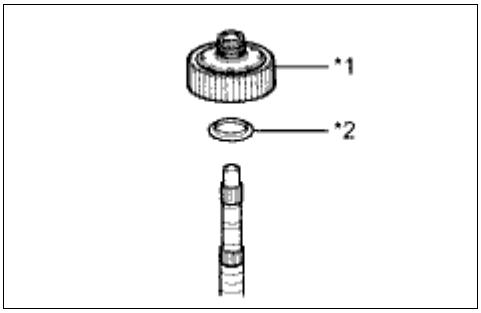
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly



74. REMOVE REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

cardiagn.com

(a) Remove the rear planetary ring gear flange sub-assembly with rear planetary ring gear from the intermediate shaft.

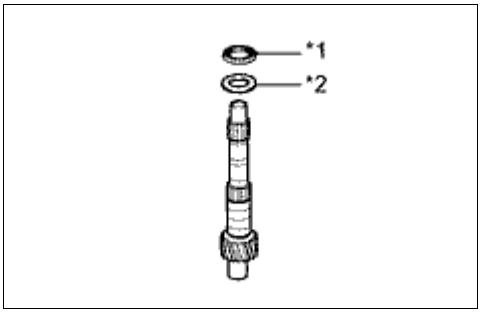


Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly with Rear Planetary Ring Gear
*2	Thrust Bearing Race

(b) Remove the thrust bearing race from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

(c) Remove the thrust needle roller bearing and thrust bearing race from the intermediate shaft.



Text in Illustration

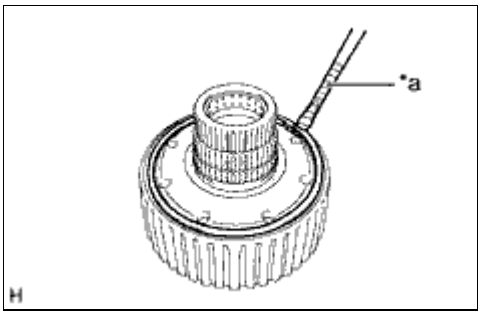
*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race

75. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

76. INSPECT INTERMEDIATE SHAFT INFO

77. REMOVE REAR PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

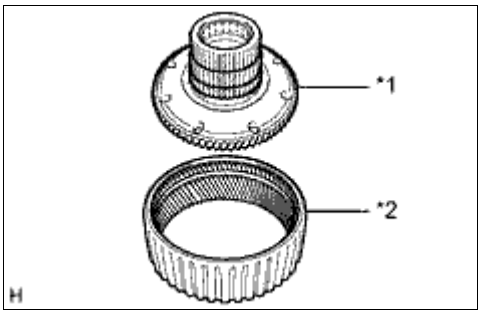
Tape the screwdriver tip before use.

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(b) Remove the rear planetary ring gear from the rear planetary ring gear flange sub-assembly.

Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

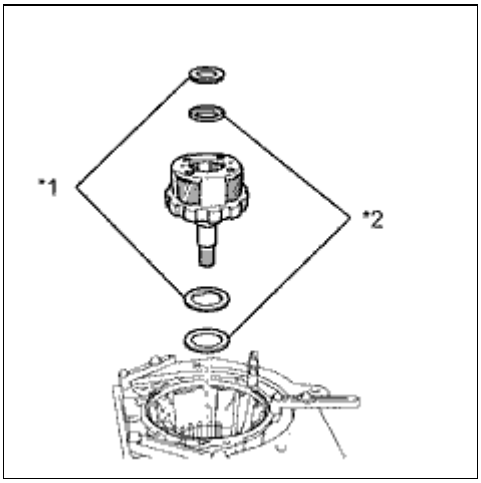


78. REMOVE REAR PLANETARY GEAR ASSEMBLY WITH NO. 4 BRAKE DISC

(a) Remove the rear planetary gear assembly with No. 4 brake disc from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race



(b) Remove the 2 thrust needle roller bearings and thrust bearing race from the rear planetary gear assembly with No. 4 brake disc.

(c) Remove the thrust bearing race from the automatic transmission case sub-assembly.

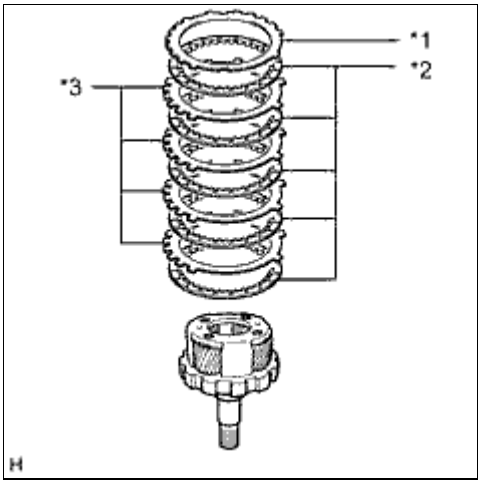
79. INSPECT REAR PLANETARY GEAR ASSEMBLY INFO

80. REMOVE NO. 4 BRAKE DISC

(a) Remove the No. 4 brake flange, 5 No. 4 brake discs and 4 No. 4 brake plates from the rear planetary gear assembly.

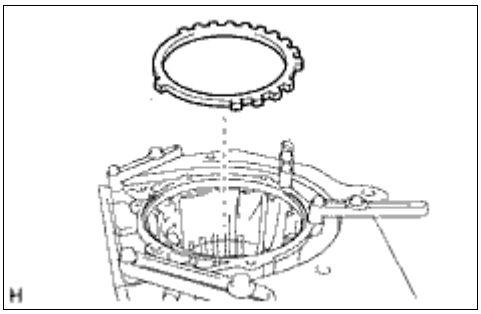
Text in Illustration

*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate



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(b) Remove the No. 4 brake flange from the automatic transmission case sub-assembly.



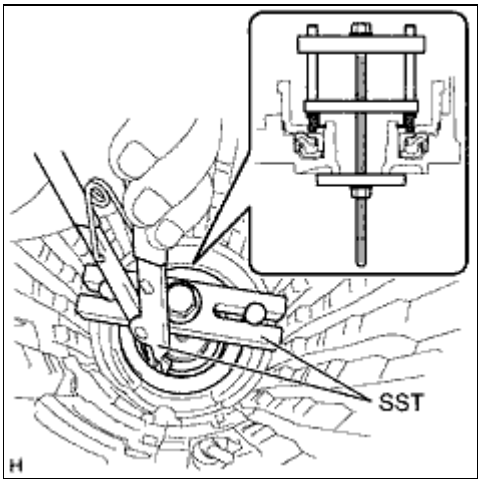
81. INSPECT NO. 4 BRAKE DISC INFO

82. REMOVE 1ST AND REVERSE BRAKE PISTON

(a) Place SST on the 1st and reverse brake return spring sub-assembly and compress the 1st and reverse brake return spring sub-assembly.

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

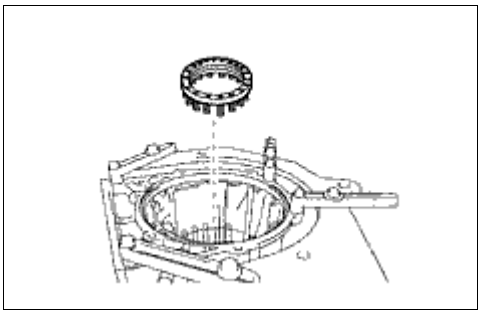


(b) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

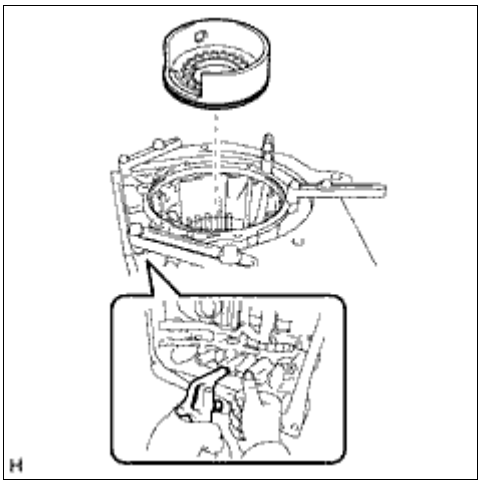
09350-07070

(c) Remove the 1st and reverse brake return spring sub-assembly from the automatic transmission case sub-assembly.



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(d) Apply compressed air to the oil hole of the automatic transmission case sub-assembly to remove the 1st and reverse brake piston from the automatic transmission case sub-assembly.



(e) Remove the O-ring from the 1st and reverse brake piston.

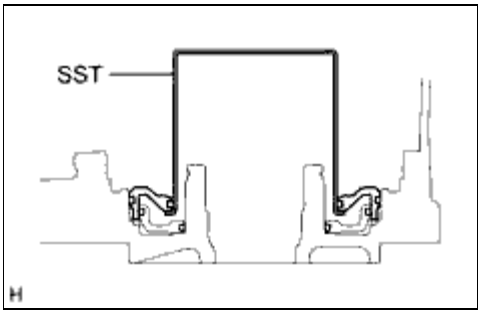
83. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY INFO

84. REMOVE BRAKE REACTION SLEEVE

(a) Using SST, remove the brake reaction sleeve from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07080



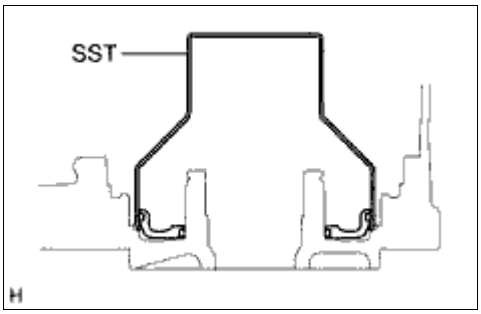
(b) Remove the 2 O-rings from the brake reaction sleeve.

85. REMOVE NO. 4 BRAKE PISTON

(a) Using SST, remove the No. 4 brake piston from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07090

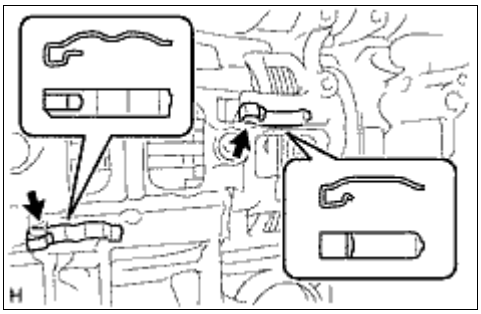


(b) Remove the 2 O-rings from the No. 4 brake piston.

86. REMOVE BRAKE PLATE STOPPER SPRING

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(a) Remove the 2 brake plate stopper springs from the automatic transmission case sub-assembly.



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000O9W055X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): INSPECTION; 2016 MY Tacoma [08/2015 -]		

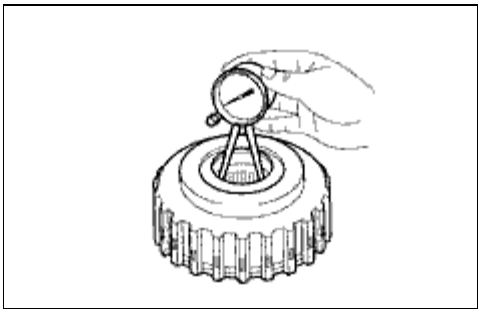
INSPECTION

1. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the direct clutch drum sub-assembly bushing.

Standard inside diameter:
59.515 to 59.540 mm (2.3432 to 2.3440 in.)

If the inside diameter is not as specified, replace the direct clutch drum sub-assembly.

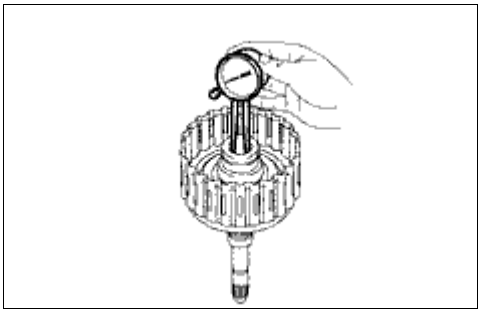


2. INSPECT INPUT SHAFT SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the input shaft sub-assembly bushing.

Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the input shaft sub-assembly.

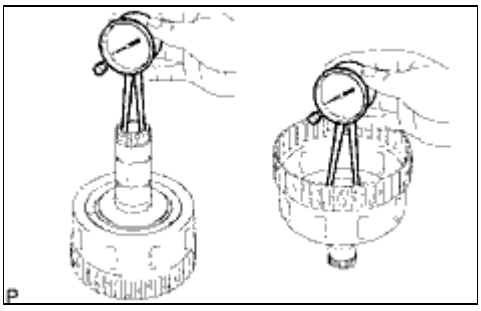


3. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the forward clutch hub sub-assembly bushing.

Standard inside diameter:
26.037 to 26.062 mm (1.0251 to 1.0260 in.)

If the inside diameter is not as specified, replace the forward clutch hub sub-assembly.



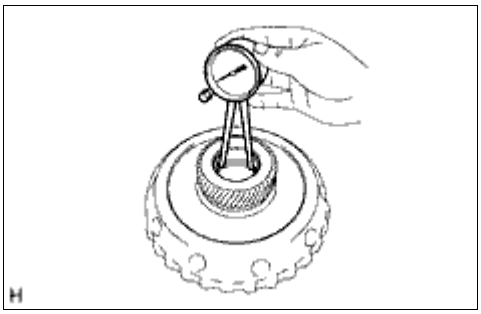
4. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY

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(a) Using a caliper gauge, measure the inside diameter of the sun gear input drum sub-assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the sun gear input drum sub-assembly.

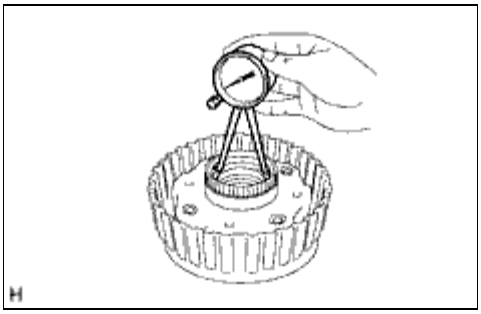


5. INSPECT FRONT PLANETARY GEAR ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary gear assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the front planetary gear assembly.

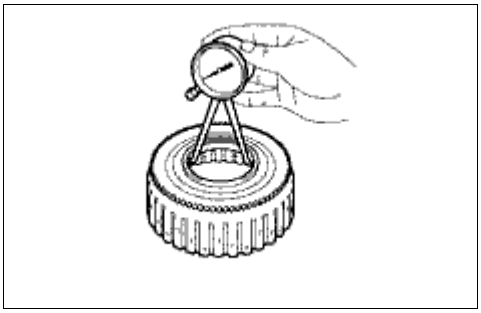


6. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
54.038 to 54.063 mm (2.1275 to 2.1284 in.)

If the inside diameter is not as specified, replace the front planetary ring gear flange sub-assembly.

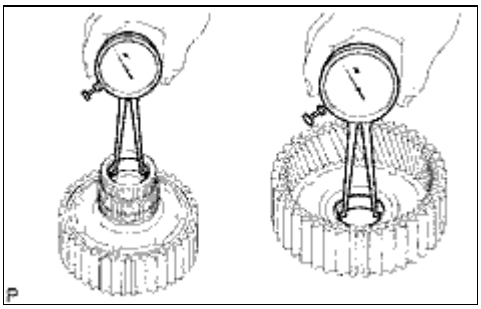


7. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the rear planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
32.176 to 32.201 mm (1.2668 to 1.2677 in.)

If the inside diameter is not as specified, replace the rear planetary ring gear flange sub-assembly.



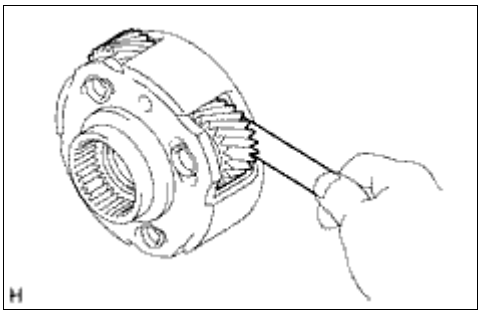
8. INSPECT CENTER PLANETARY GEAR ASSEMBLY

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(a) Using a feeler gauge, measure the center planetary gear pinion thrust clearance.

Standard clearance:
0.12 to 0.68 mm (0.00473 to 0.0267 in.)

If the clearance is not as specified, replace the center planetary gear assembly.

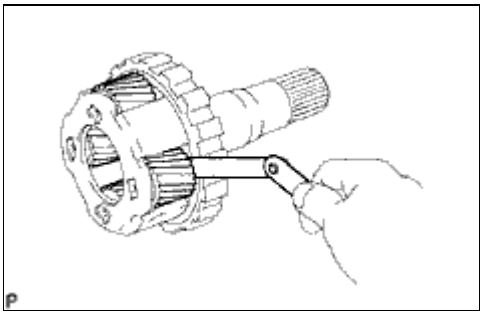


9. INSPECT REAR PLANETARY GEAR ASSEMBLY

(a) Using a feeler gauge, measure the rear planetary gear pinion thrust clearance.

Standard clearance:
0.2 to 0.6 mm (0.00788 to 0.0236 in.)

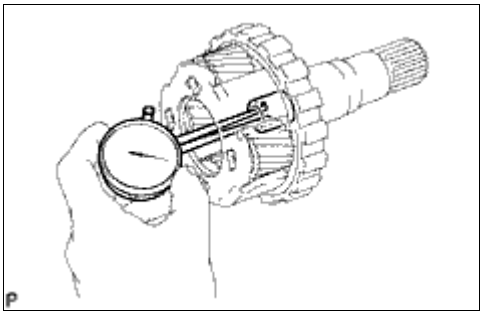
If the clearance is not as specified, replace the rear planetary gear assembly.



(b) Using a caliper gauge, measure the inside diameter of the rear planetary gear bushing.

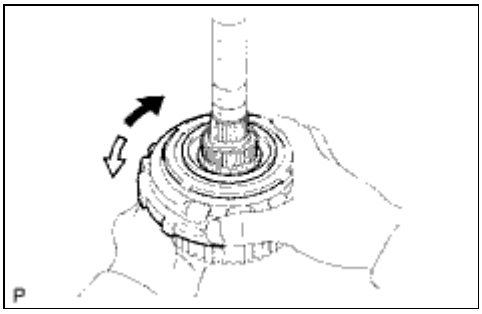
Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the rear planetary gear assembly.



10. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY

(a) Hold the rear planetary ring gear and turn the No. 3 one-way clutch assembly.



Text in Illustration

➡	Lock
⇨	Free

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(b) Check that the No. 3 one-way clutch assembly turns freely when turned counterclockwise and locks when turned clockwise.

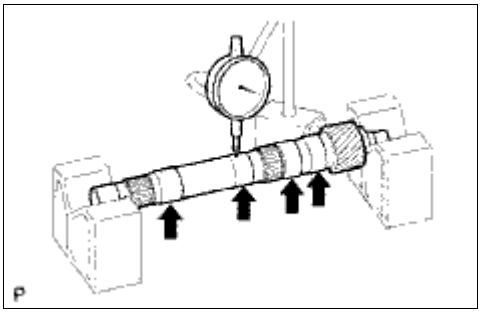
If there is a problem with the No. 3 one-way clutch assembly, replace it.

11. INSPECT INTERMEDIATE SHAFT

(a) Using a dial indicator and V-blocks, check the intermediate shaft runout.

Standard runout:
0.03 mm (0.00118 in.)

If the runout is more than the standard, replace the intermediate shaft with a new one.



(b) Using a micrometer, check the outer diameter of the intermediate shaft at each point shown in the illustration.

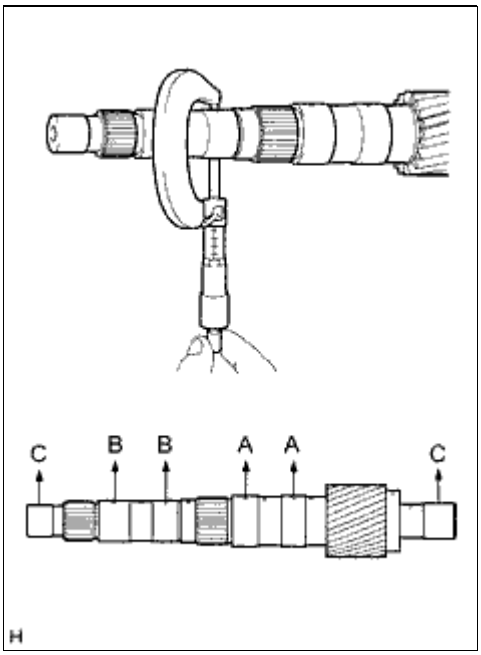
Standard diameter:

A
32.062 to 32.075 mm (1.2623 to 1.2627 in.)

B
25.962 to 25.975 mm (1.0222 to 1.0226 in.)

C
19.963 to 19.976 mm (0.7860 to 0.7864 in.)

If the outer diameter is more than the standard, replace the intermediate shaft with a new one.

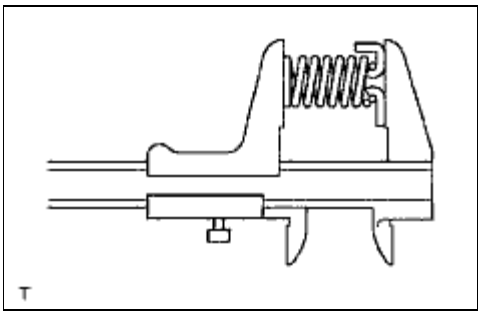


12. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the forward clutch return spring sub-assembly including the spring seat.

Standard free length:
26.74 mm (1.053 in.)

If the free length is more than the standard free length, replace the forward clutch return spring sub-assembly.



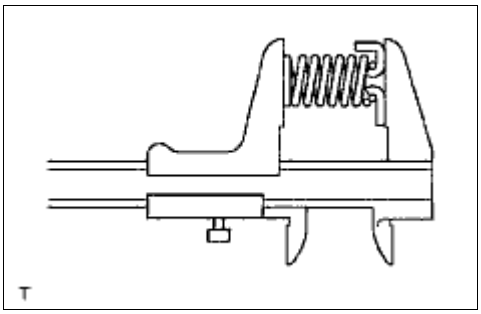
13. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY

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(a) Using a vernier caliper, measure the free length of the direct clutch return spring sub-assembly including the spring seat.

Standard free length:
22.14 mm (0.872 in.)

If the free length is more than the standard free length, replace the direct clutch return spring sub-assembly.

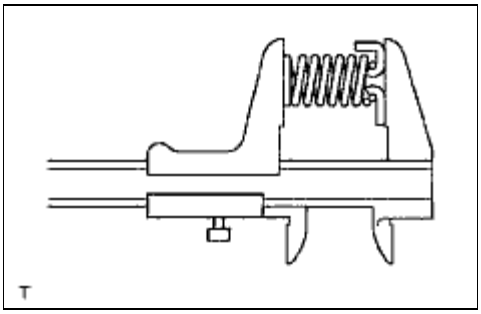


14. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 1 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.72 mm (0.658 in.)

If the free length is more than the standard free length, replace the No. 1 brake piston return spring sub-assembly.

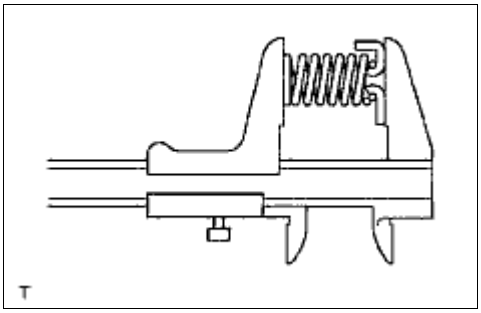


15. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 2 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.68 mm (0.657 in.)

If the free length is more than the standard free length, replace the No. 2 brake piston return spring sub-assembly.

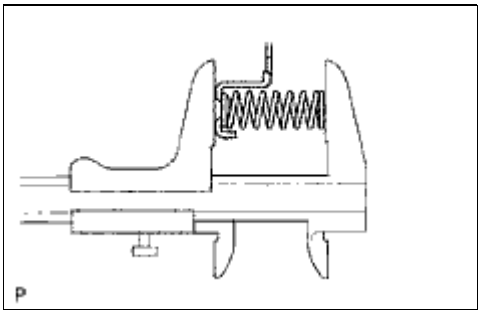


16. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the 1st and reverse brake return spring sub-assembly including the spring seat.

Standard free length:
23.74 mm (0.935 in.)

If the free length is more than the standard free length, replace the 1st and reverse return spring sub-assembly.

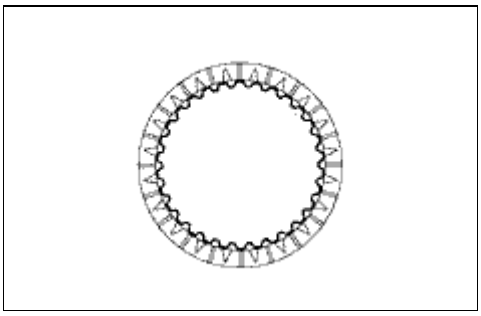


17. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

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(a) Check if the contact surfaces of the No. 1 clutch discs, No. 1 clutch plates and No. 1 clutch flange are worn or burnt.

If necessary, replace them.



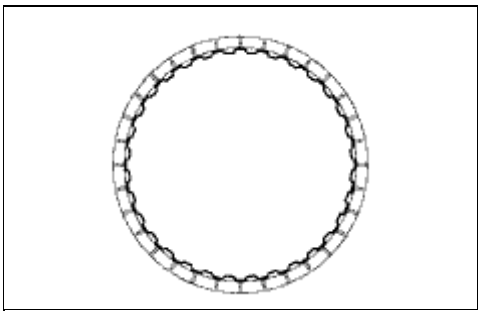
NOTICE:

- If the lining of any No. 1 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 clutch discs.
- Before installing new No. 1 clutch discs, soak them in ATF for at least 15 minutes.

18. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Check if the contact surfaces of the No. 2 clutch discs, No. 2 clutch plates and No. 2 clutch flange are worn or burnt.

If necessary, replace them.



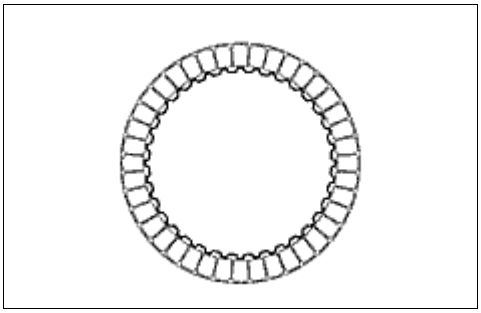
NOTICE:

- If the lining of any No. 2 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 clutch discs.
- Before installing new No. 2 clutch discs, soak them in ATF for at least 15 minutes.

19. INSPECT NO. 1 BRAKE DISC

(a) Check if the contact surfaces of the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are worn or burnt.

If necessary, replace them.



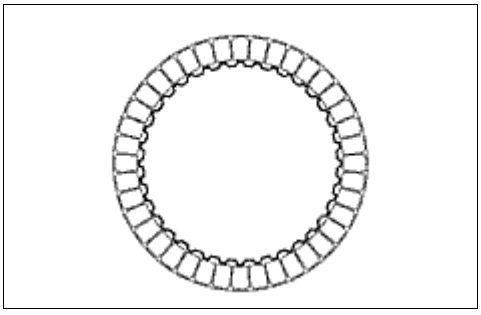
NOTICE:

- If the lining of any No. 1 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 brake discs.
- Before installing new No. 1 brake discs, soak them in ATF for at least 15 minutes.

20. INSPECT NO. 2 BRAKE DISC

(a) Check if the contact surfaces of the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

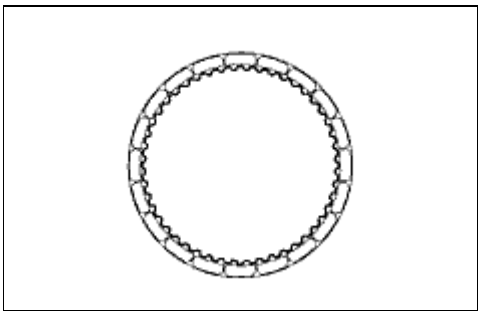
- If the lining of any No. 2 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 brake discs.
- Before installing new No. 2 brake discs, soak them in ATF for at least 15 minutes.

21. INSPECT NO. 4 BRAKE DISC

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(a) Check if the contact surfaces of the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

- If the lining of any No. 4 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 4 brake discs.
- Before installing new No. 4 brake discs, soak them in ATF for at least 15 minutes.

22. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH)

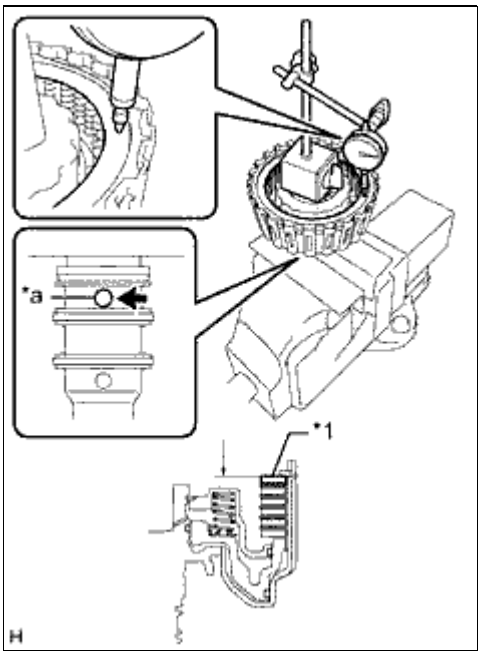
(a) Using a dial indicator, measure the clearance of the No. 1 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Forward Clutch Flange
*a	Oil Hole

Standard clearance:
0.75 to 1.05 mm (0.0296 to 0.0413 in.)

If the clearance is not as specified, select and install an appropriate forward clutch flange that will bring the clearance within the specified range.



HINT:

There are forward clutch flanges of different thicknesses.

Forward Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35635-04010	3.0 (0.118)
35635-04020	3.1 (0.122)
35635-04030	3.2 (0.126)
35635-04040	3.3 (0.130)
35635-04050	3.4 (0.134)
35635-04060	3.5 (0.138)
35635-04070	3.6 (0.142)
35635-04080	3.7 (0.146)
35635-04090	3.8 (0.150)
35635-04100	3.9 (0.154)
35635-04110	4.0 (0.157)

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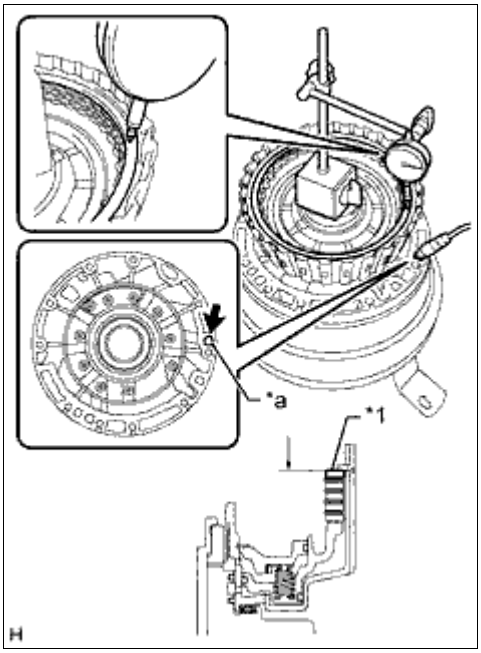
PART NO.	THICKNESS (MM (IN.))
35635-04120	4.1 (0.161)
35635-04130	4.2 (0.165)

23. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH)

(a) Using a dial indicator, measure the clearance of the No. 2 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Direct Clutch Flange
*a	Oil Hole



Standard clearance:
0.4 to 0.7 mm (0.0158 to 0.0275 in.)

If the clearance is not as specified, select and install an appropriate direct clutch flange that will bring the clearance within the specified range.

HINT:

There are direct clutch flanges of different thicknesses.

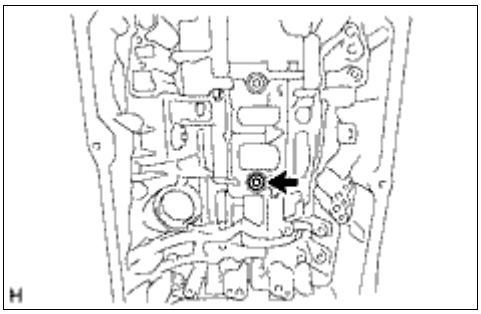
Direct Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35675-04010	3.0 (0.118)
35675-04020	3.1 (0.122)
35675-04030	3.2 (0.126)
35675-04040	3.3 (0.130)
35675-04050	3.4 (0.134)
35675-04060	3.5 (0.138)
35675-04070	3.6 (0.142)
35675-04080	3.7 (0.146)
35675-04090	3.8 (0.150)

24. INSPECT CLEARANCE OF NO. 1 BRAKE

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(a) Make sure that the No. 1 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



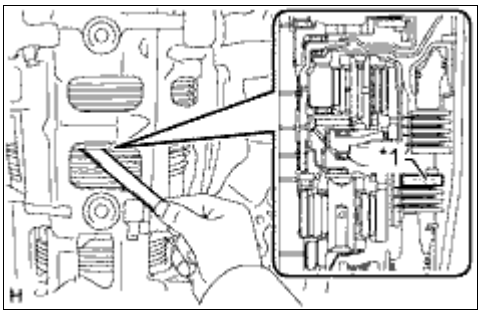
(b) Using a feeler gauge, measure the No. 1 brake pack clearance between the No. 1 brake disc and No. 1 brake flange.

Text in Illustration

*1	Selected No. 1 Brake Flange

Standard clearance:
0.3 to 0.6 mm (0.0119 to 0.0236 in.)

If the clearance is not as specified, select and install an appropriate No. 1 brake flange that will bring the clearance within the specified range.



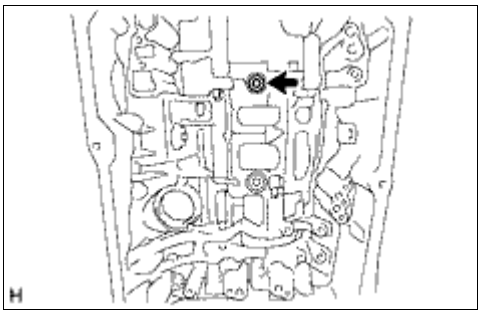
No. 1 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	4.9 (0.193)
1	5.0 (0.197)
2	5.1 (0.201)
3	5.2 (0.205)
4	5.3 (0.209)
5	5.4 (0.213)
6	5.5 (0.217)
7	5.6 (0.220)
8	5.7 (0.224)
A	5.8 (0.228)

25. INSPECT CLEARANCE OF NO. 2 BRAKE

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(a) Make sure that the No. 2 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



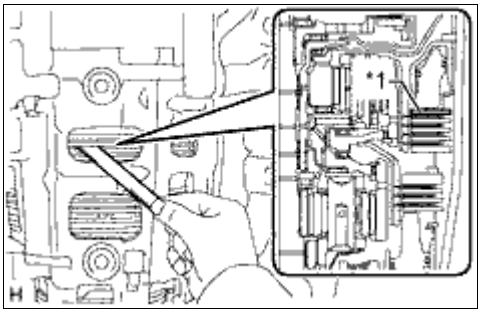
(b) Using a feeler gauge, measure the No. 2 brake pack clearance between the No. 2 brake disc and No. 2 brake flange.

Text in Illustration

*1	Selected No. 2 Brake Flange

Standard clearance:
0.4 to 0.7 mm (0.0158 to 0.0275 in.)

If the clearance is not as specified, select and install an appropriate No. 2 brake flange that will bring the clearance within the specified range.

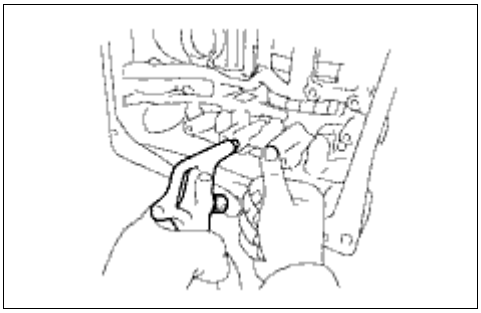


No. 2 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	2.0 (0.0787)
1	2.1 (0.0827)
2	2.2 (0.0866)
3	2.3 (0.0906)
4	2.4 (0.0945)
5	2.5 (0.0984)
6	2.6 (0.102)
7	2.7 (0.106)
8	2.8 (0.110)

26. INSPECT CLEARANCE OF NO. 4 BRAKE

(a) Make sure that the 1st and reverse brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



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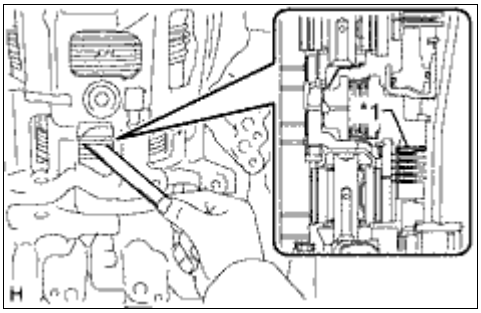
(b) Using a feeler gauge, measure the No. 4 brake pack clearance between the No. 4 brake disc and No. 4 brake flange.

Text in Illustration

*1	Selected No. 4 Brake Flange

Standard clearance:
0.5 to 0.8 mm (0.0197 to 0.0314 in.)

If the clearance is not as specified, select and install an appropriate No. 4 brake flange that will bring the clearance within the specified range.



No. 4 Brake Flange Thickness:

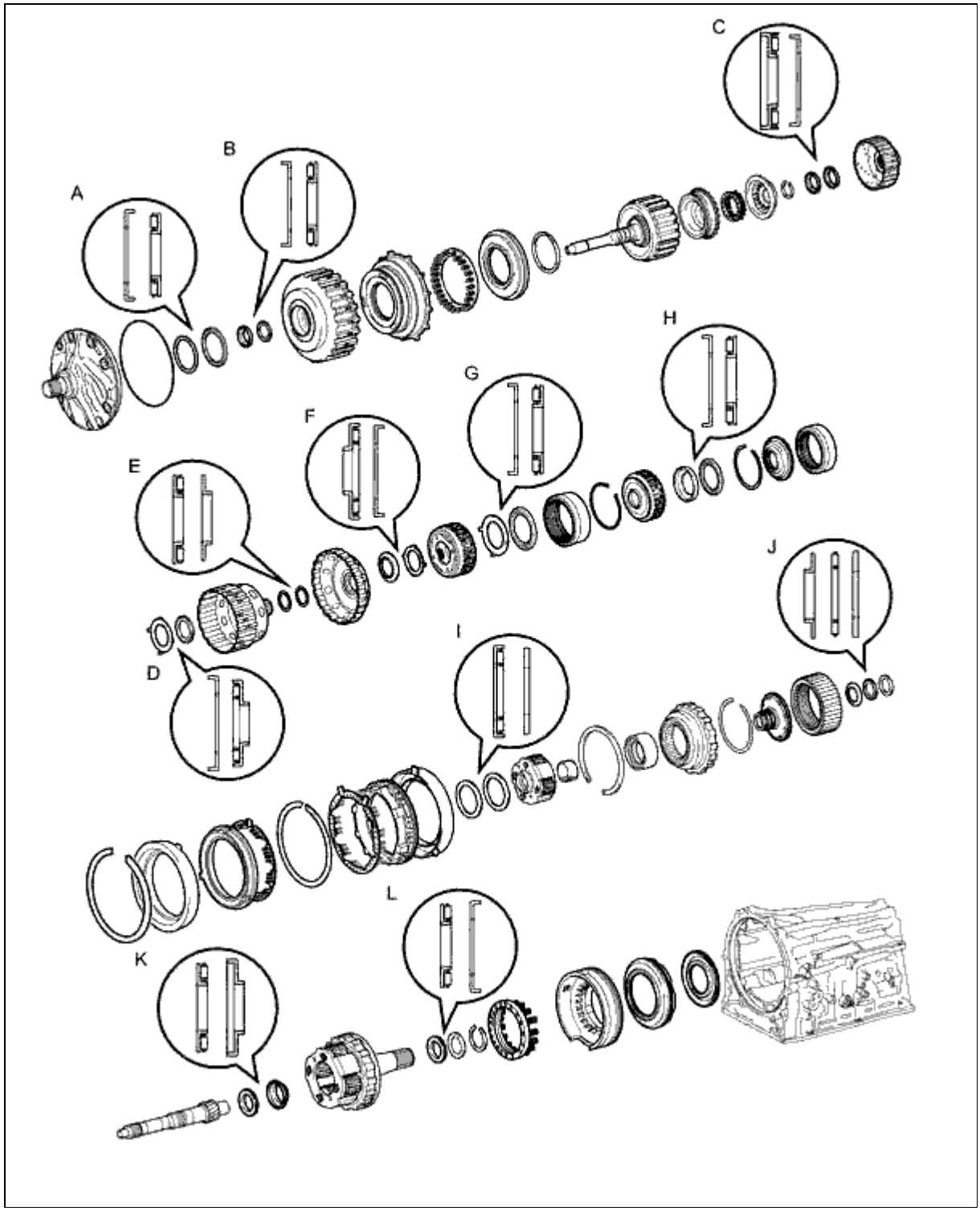
MARK	THICKNESS (MM (IN.))
0	1.8 (0.0709)
2	2.0 (0.0787)
4	2.2 (0.0866)
6	2.4 (0.0945)
8	2.6 (0.102)
10	2.8 (0.110)
12	3.0 (0.118)
14	3.2 (0.126)

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA0050X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. BEARING POSITION

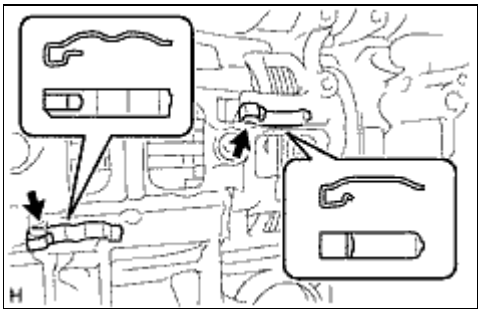


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MARK	FRONT RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))	THRUST BEARING DIAMETER INSIDE / OUTSIDE (MM (IN.))	REAR RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))
A	74.2 (2.921) / 87.74 (3.454)	71.9 (2.831) / 85.6 (3.370)	-
B	40.0 (1.575) / 52.8 (2.079)	34.6 (1.362) / 52.0 (2.047)	-
C	22.0 (0.866) / 44.8 (1.764)	21.3 (0.839) / 41.1 (1.618)	-
D	38.4 (1.512) / 56.5 (2.224)	33.3 (1.311) / 56.6 (2.228)	-
E	-	40.83 (1.607) / 52.8 (2.079)	39.6 (1.559) / 52.8 (2.079)
F	-	37.1 (1.461) / 61.2 (2.409)	44.0 (1.732) / 62.8 (2.472)
G	65.8 (2.591) / 86.3 (3.398)	63.3 (2.492) / 78.8 (3.102)	-
H	66.3 (2.610) / 78.9 (3.106)	63.3 (2.492) / 78.8 (3.102)	-
I	-	55.7 (2.193) / 76.4 (3.008)	53.7 (2.114) / 74.0 (2.913)
J	33.4 (1.315) / 49.0 (1.929)	32.1 (1.264) / 49.35 (1.943)	32.1 (1.264) / 49.0 (1.929)
K	-	21.0 (0.827) / 41.5 (1.634)	23.13 (0.911) / 41.5 (1.634)
L	-	43.55 (1.715) / 61.0 (2.402)	47.1 (1.854) / 67.1 (2.642)

2. INSTALL BRAKE PLATE STOPPER SPRING

(a) Install the 2 brake plate stopper springs to the automatic transmission case sub-assembly.



NOTICE:

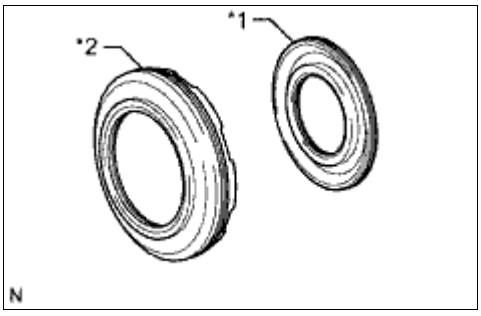
The shapes of the parts are different. Refer to the illustration when installing the parts.

3. INSTALL NO. 4 BRAKE PISTON

(a) Coat 2 new O-rings with ATF, and install them to the brake reaction sleeve.

(b) Coat 2 new O-rings with ATF, and install them to the No. 4 brake piston.

(c) Install the No. 4 brake piston to the brake reaction sleeve.



Text in Illustration

*1	No. 4 Brake Piston
*2	Brake Reaction Sleeve

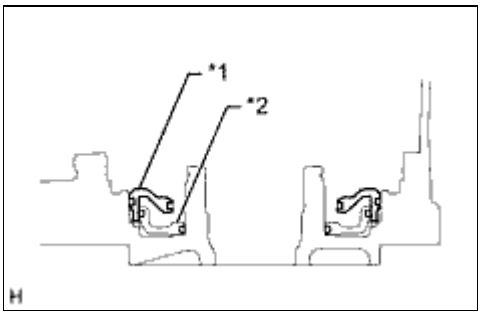
NOTICE:

Be careful not to damage the O-rings.

4. INSTALL BRAKE REACTION SLEEVE

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(a) With the No. 4 brake piston underneath (the rear side), install the brake reaction sleeve and No. 4 brake piston to the automatic transmission case sub-assembly.



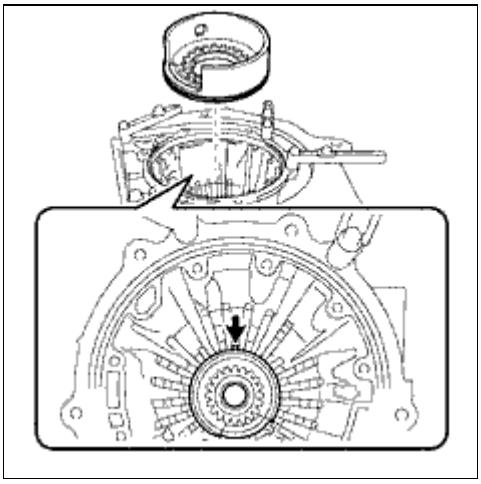
Text in Illustration

*1	Brake Reaction Sleeve
*2	No. 4 Brake Piston

NOTICE:

Be careful not to damage the O-rings.

5. INSTALL 1ST AND REVERSE BRAKE PISTON

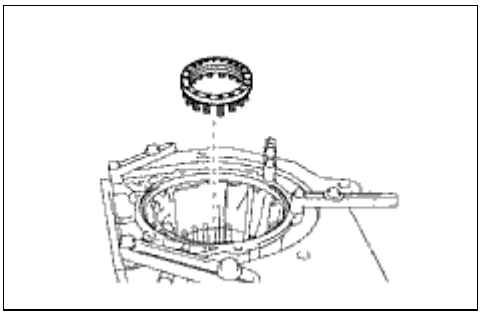


(a) Coat a new O-ring with ATF, and install it to the 1st and reverse brake piston.

(b) Install the 1st and reverse brake piston to the automatic transmission case sub-assembly while making sure that the protrusion of the 1st and reverse brake piston is positioned as shown in the illustration.

NOTICE:

Be careful not to damage the O-ring.

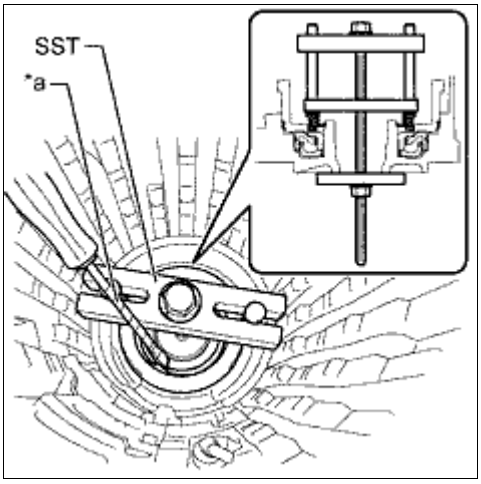


(c) Install the 1st and reverse brake return spring sub-assembly to the automatic transmission case sub-assembly.

(d) Place the 1st and reverse brake return spring sub-assembly onto the 1st and reverse brake piston.

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(e) Place SST on the 1st and reverse brake return spring sub-assembly, and compress the 1st and reverse brake return spring sub-assembly.



Text in Illustration

*a	Protective Tape

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

(f) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the 1st and reverse brake return spring sub-assembly and automatic transmission case sub-assembly.

HINT:

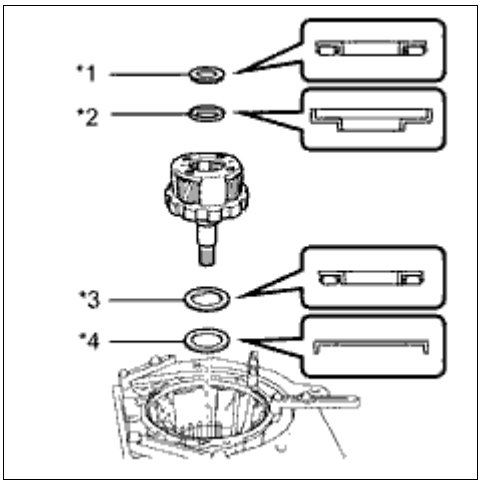
Tape the screwdriver tip before use.

6. INSTALL REAR PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing K
*2	Thrust Bearing Race K
*3	Thrust Needle Roller Bearing L
*4	Thrust Bearing Race L



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing K	21.0 (0.827)	41.5 (1.634)
Thrust Bearing Race K	23.13 (0.911)	41.5 (1.634)
Thrust Needle Roller Bearing L	43.55 (1.715)	61.0 (2.402)
Thrust Bearing Race L	47.1 (1.854)	67.1 (2.642)

NOTICE:

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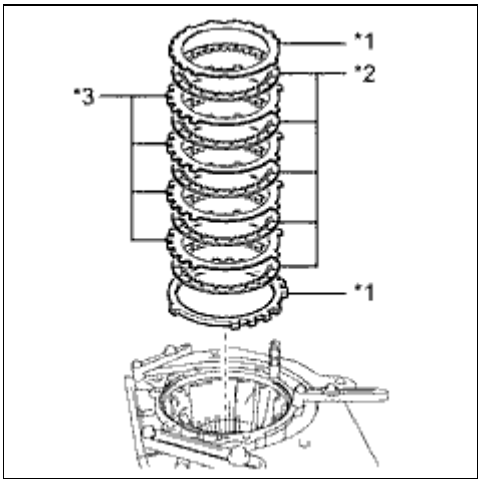
Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Coat the 2 thrust needle roller bearings and thrust bearing race with ATF and install them to the rear planetary gear assembly.

(c) Install the rear planetary gear assembly to the automatic transmission case sub-assembly.

7. INSTALL NO. 4 BRAKE DISC

(a) Install the 2 No. 4 brake flanges, 5 No. 4 brake discs and 4 No. 4 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

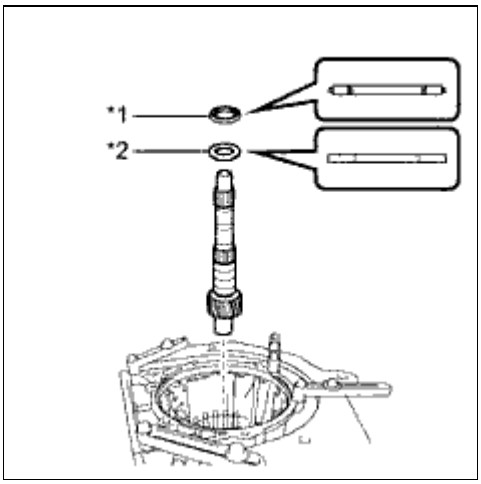
*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate

NOTICE:

- Make sure that the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are installed in the correct order.
- Install the thicker No. 4 brake flange first, and then install the thinner one.

8. INSTALL INTERMEDIATE SHAFT

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the intermediate shaft.



Text in Illustration

*1	Thrust Needle Roller Bearing J
*2	Thrust Bearing Race J (Rear Race)

Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

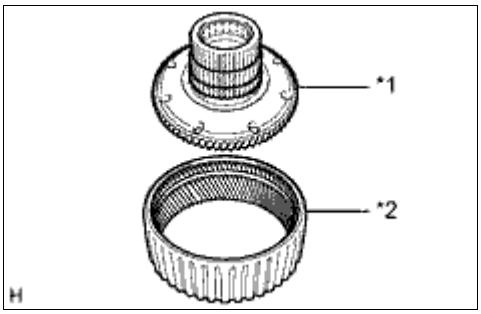
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing J	32.1 (1.264)	49.35 (1.943)
Thrust Bearing Race J (Rear Race)	32.1 (1.264)	49.0 (1.929)

(b) Install the intermediate shaft to the automatic transmission case sub-assembly.

9. INSTALL REAR PLANETARY RING GEAR

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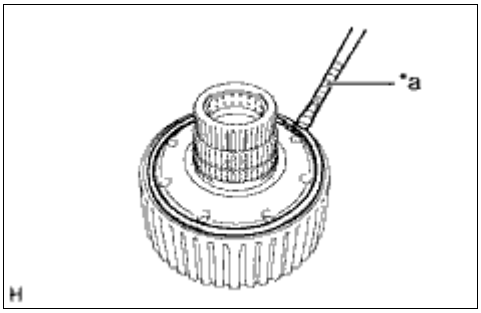
(a) Install the rear planetary ring gear to the rear planetary ring gear flange sub-assembly.



Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

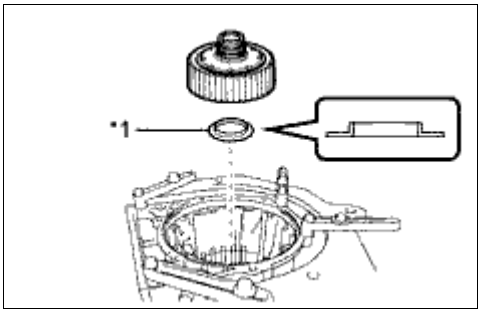
Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

Tape the screwdriver tip before use.

10. INSTALL REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

(a) Coat the thrust bearing race with ATF and install it to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*1	Thrust Bearing Race J (Front Race)

Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race J (Front Race)	33.4 (1.315.)	49.0 (1.929)

NOTICE:

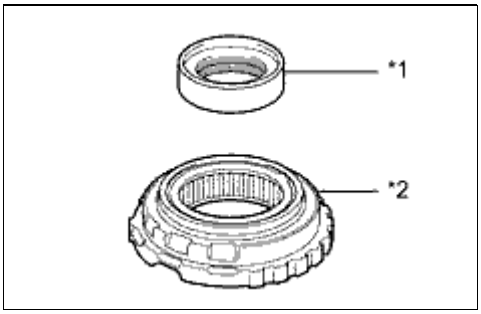
Be sure to install the thrust bearing race in the correct direction.

(b) Install the rear planetary ring gear flange sub-assembly with rear planetary ring gear to the automatic transmission case sub-assembly.

11. INSTALL ONE-WAY CLUTCH INNER RACE

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(a) Install the one-way clutch inner race to the No. 3 one-way clutch assembly.



Text in Illustration

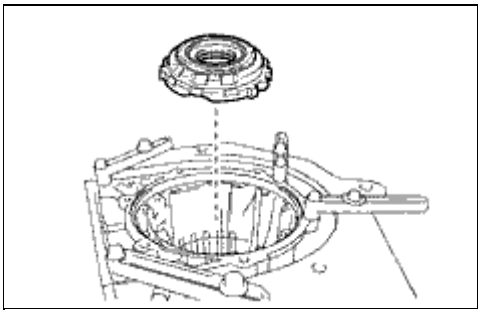
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly

HINT:

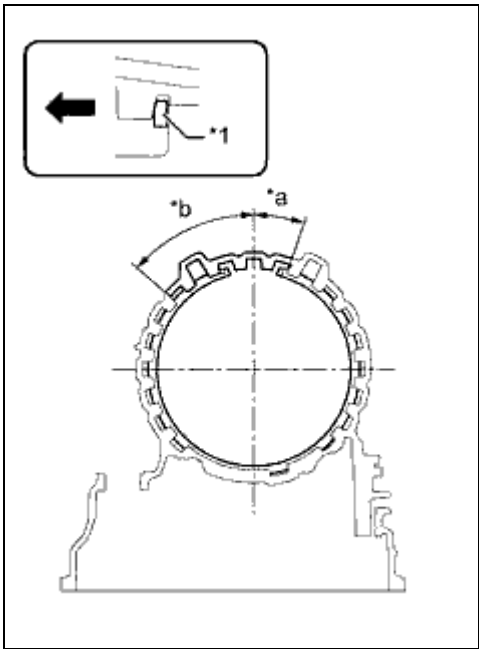
Rotate the one-way clutch inner race clockwise to install it.

12. INSTALL NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Install the No. 3 one-way clutch assembly with one-way clutch inner race to the automatic transmission case sub-assembly.



(b) Using SST, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*1	Snap Ring
*a	19°
*b	49°
➡	Front Side

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SST: 09350-30020

09350-07060

NOTICE:

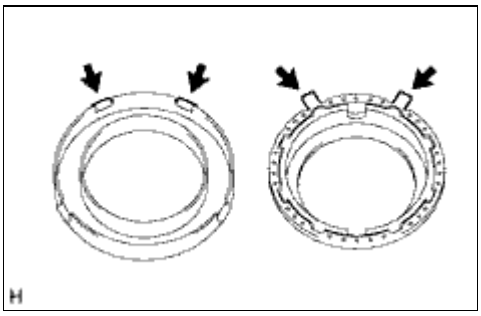
- Install the snap ring so that the tapered side is facing out.
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.

13. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

14. INSTALL NO. 1 BRAKE PISTON

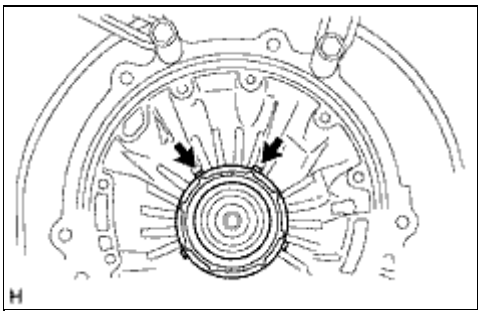
(a) Coat 2 new O-rings with ATF and install them to the No. 1 brake piston.

(b) With the No. 1 brake piston return spring sub-assembly installed to the No. 1 brake piston, align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston to the No. 1 brake cylinder.



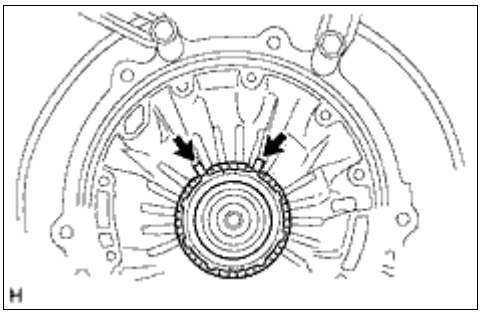
15. INSTALL NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

(a) Install the No. 1 brake cylinder with No. 1 brake piston to the automatic transmission case sub-assembly while making sure that the 2 claws of the No. 1 brake cylinder with No. 1 brake piston are positioned as shown in the illustration.



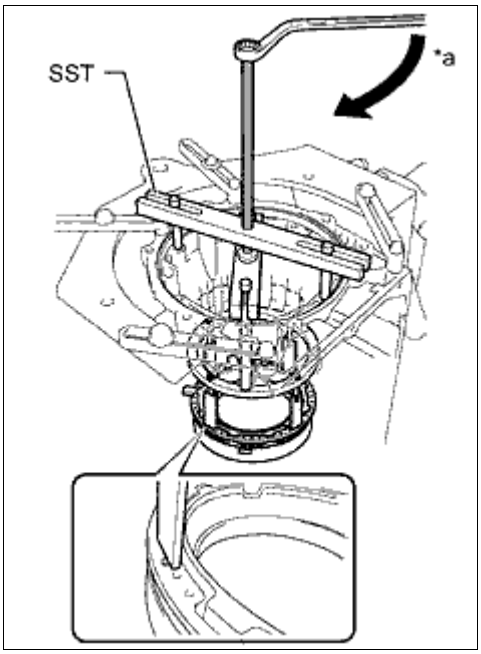
16. INSTALL NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston return spring sub-assembly to the No. 1 brake piston.



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(b) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



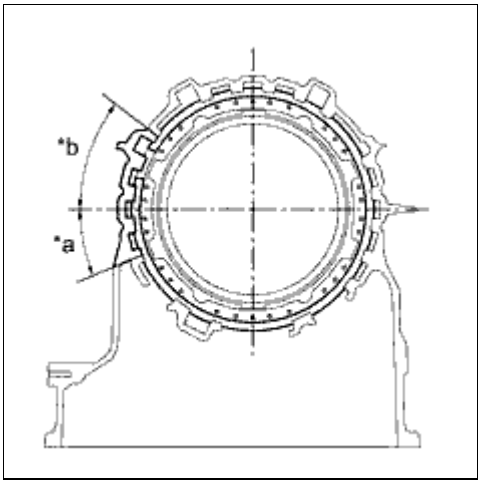
Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06040
09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(c) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

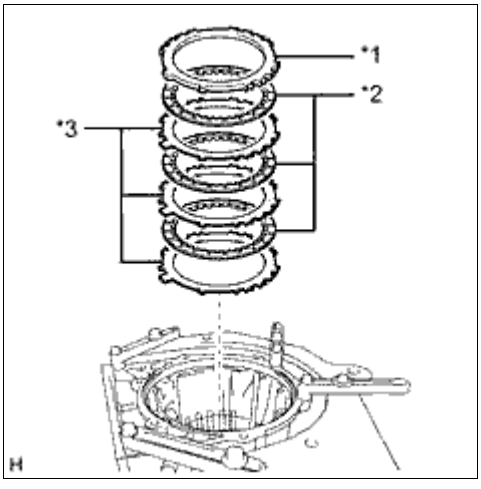
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

17. INSTALL NO. 1 BRAKE DISC

(a) Install the No. 1 brake flange, 3 No. 1 brake discs and 3 No. 1 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

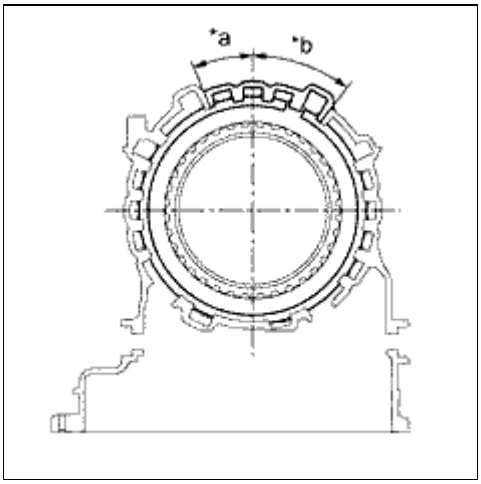
*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

NOTICE:

Make sure that the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are installed in the correct order.

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(b) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

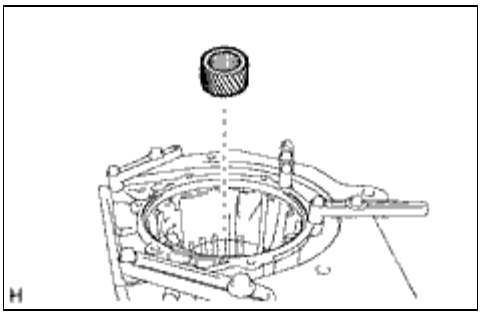
HINT:

Tape the screwdriver tip before use.

18. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

19. INSTALL PLANETARY SUN GEAR

(a) Install the planetary sun gear to the automatic transmission case sub-assembly.

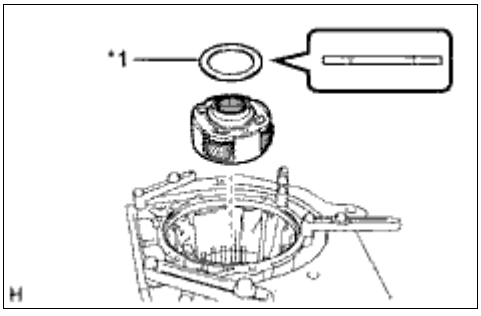


20. INSTALL CENTER PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the center planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race I



Thrust Bearing Race Diameter:

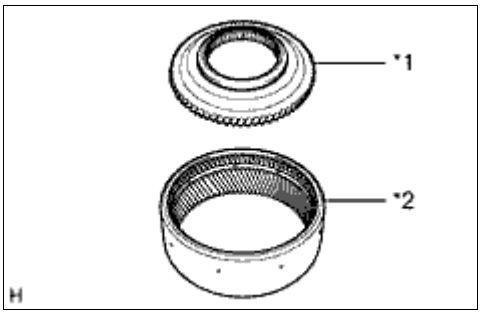
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race I	53.7 (2.114)	74.0 (2.913)

(b) Install the center planetary gear assembly to the automatic transmission case sub-assembly.

21. INSTALL CENTER PLANETARY RING GEAR

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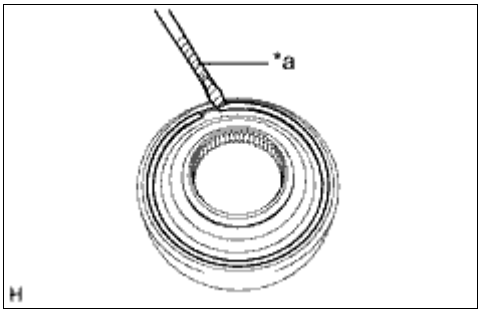
(a) Install the center planetary ring gear to the center planetary ring gear flange.



Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the center planetary ring gear flange with center planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

HINT:

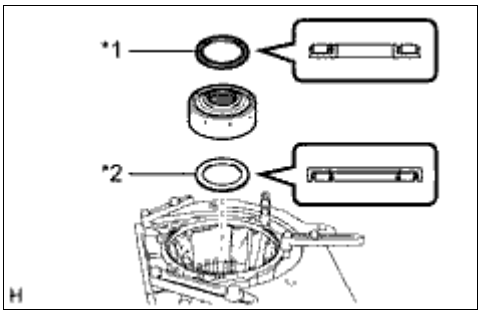
Tape the screwdriver tip before use.

22. INSTALL CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

(a) Coat the 2 thrust needle roller bearings with ATF and install them to the center planetary ring gear flange with center planetary ring gear.

Text in Illustration

*1	Thrust Needle Roller Bearing H
*2	Thrust Needle Roller Bearing I



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing H	63.3 (2.492)	78.8 (3.102)
Thrust Needle Roller Bearing I	55.7 (2.193)	76.4 (3.008)

NOTICE:

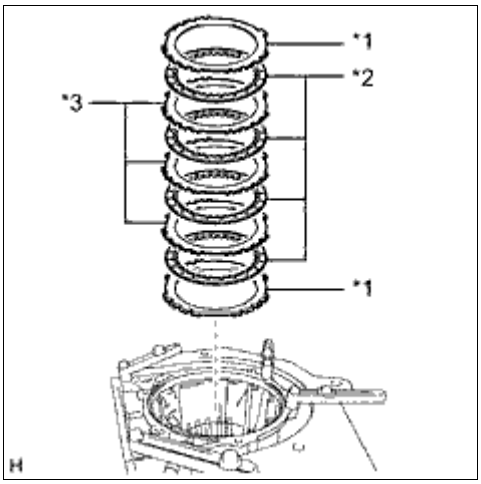
Be sure to install the thrust needle roller bearing in the correct direction.

(b) Install the center planetary ring gear flange with center planetary ring gear to the automatic transmission case sub-assembly.

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23. INSTALL NO. 2 BRAKE DISC

(a) Install the 2 No. 2 brake flanges, 4 No. 2 brake discs and 3 No. 2 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate

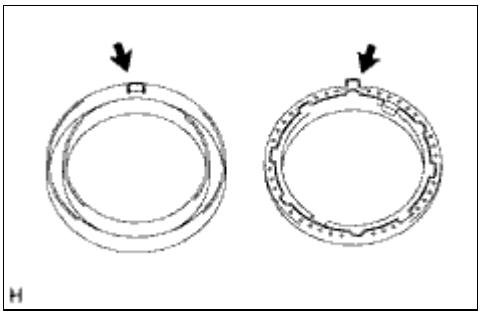
NOTICE:

- Make sure that the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are installed in the correct order.
- Install the thicker No. 2 brake flange first, and then install the thinner one.

24. INSTALL NO. 2 BRAKE PISTON

(a) Coat 2 new O-rings with ATF and install them to the No. 2 brake piston.

(b) With the No. 2 brake piston return spring sub-assembly installed to the No. 2 brake piston, align the claw of the No. 2 brake piston return spring sub-assembly with the claw of the No. 2 brake cylinder, and then install the No. 2 brake piston to the No. 2 brake cylinder.

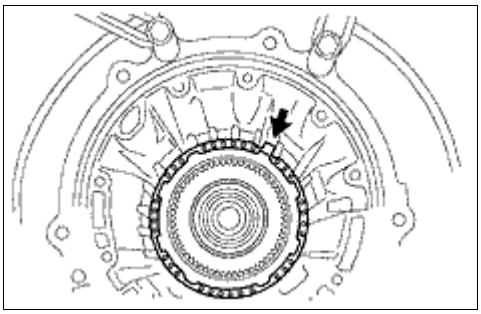


NOTICE:

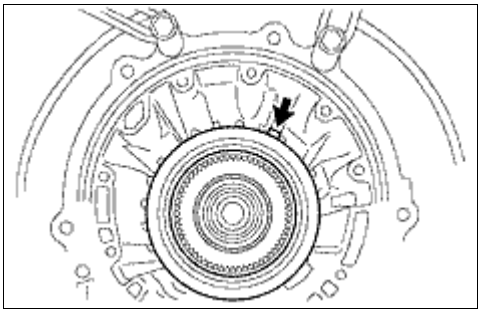
Be careful not to damage the O-rings.

25. INSTALL NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Install the No. 2 brake piston return spring sub-assembly to the automatic transmission case sub-assembly while making sure that the claw of the No. 2 brake piston return spring sub-assembly is positioned as shown in the illustration.

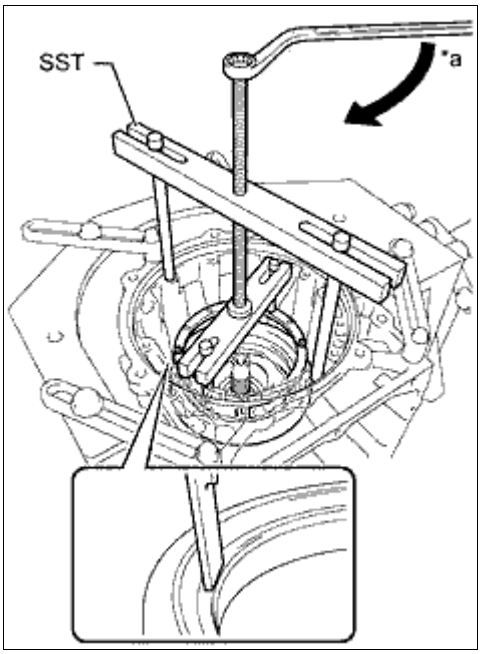


(b) Install the No. 2 brake cylinder with No. 2 brake piston to the automatic transmission case sub-assembly while making sure that the claw of the No. 1 brake cylinder with No. 1 brake piston is positioned as shown in the illustration.



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(c) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



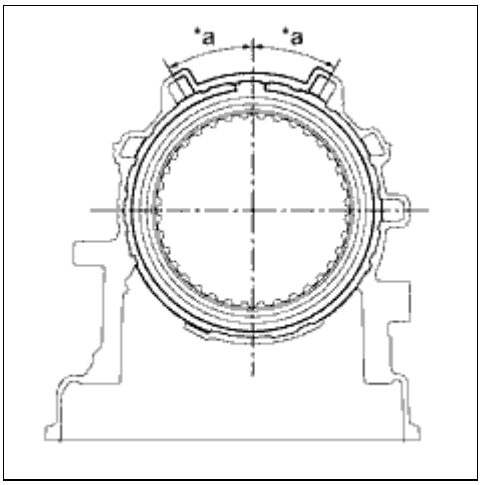
Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
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09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(d) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	30°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

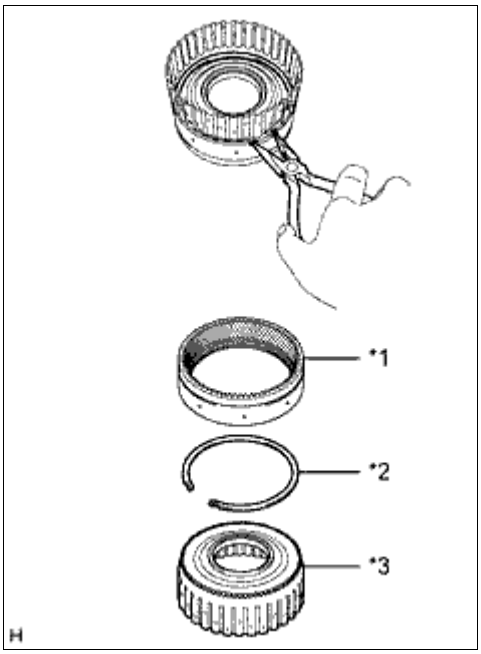
Tape the screwdriver tip before use.

26. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

27. INSTALL FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

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(a) Set the snap ring onto the front planetary ring gear flange sub-assembly. Using needle-nose pliers, insert the snap ring into the front planetary ring gear while squeezing it, and then expand the snap ring to install it.



Text in Illustration

*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly

NOTICE:

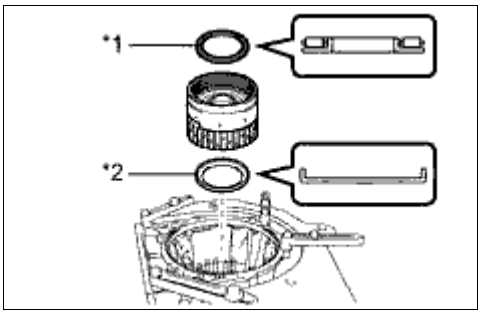
Make sure the snap ring is securely inserted into the groove of the front planetary ring gear.

28. INSTALL FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the front planetary ring gear with front planetary ring gear flange sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing G
*2	Thrust Bearing Race H



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing G	63.3 (2.492)	78.8 (3.102)
Thrust Bearing Race H	66.3 (2.610)	78.9 (3.106)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the front planetary ring gear with front planetary ring gear flange sub-assembly to the automatic transmission case sub-assembly.

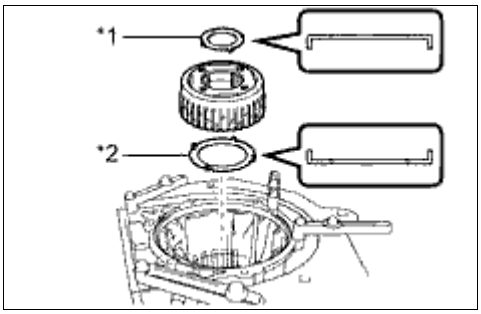
29. INSTALL FRONT PLANETARY GEAR ASSEMBLY

cardiagn.com

(a) Coat the 2 thrust bearing races with ATF and install them to the front planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race F
*2	Thrust Bearing Race G



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race F	44.0 (1.732)	62.8 (2.472)
Thrust Bearing Race G	65.8 (2.591)	86.3 (3.398)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

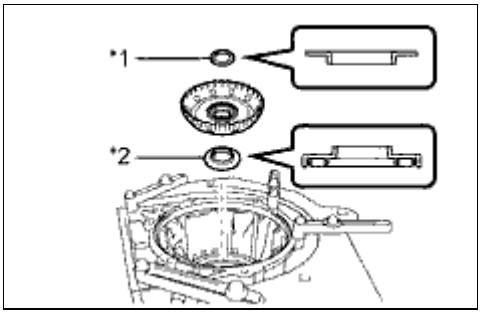
(b) Install the front planetary gear assembly to the automatic transmission case sub-assembly.

30. INSTALL SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the sun gear input drum sub-assembly.

Text in Illustration

*1	Thrust Bearing Race E
*2	Thrust Needle Roller Bearing F



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race E	40.83 (1.607)	52.8 (2.079)
Thrust Needle Roller Bearing F	37.1 (1.461)	61.2 (2.409)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the sun gear input drum sub-assembly to the automatic transmission case sub-assembly.

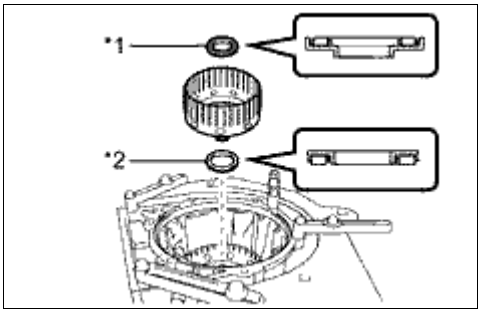
31. INSTALL FORWARD CLUTCH HUB SUB-ASSEMBLY

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(a) Coat the 2 thrust needle roller bearings with ATF and install them to the forward clutch hub sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing D
*2	Thrust Needle Roller Bearing E



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing D	33.3 (1.311)	56.6 (2.228)
Thrust Needle Roller Bearing E	39.6 (1.559)	52.8 (2.079)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

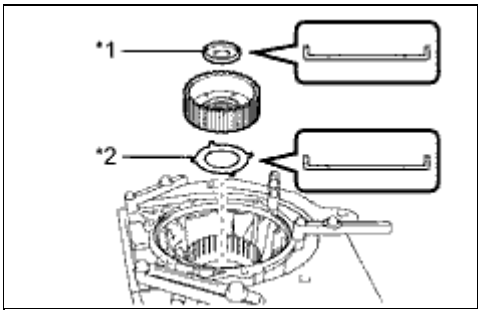
(b) Install the forward clutch hub sub-assembly to the automatic transmission case sub-assembly.

32. INSTALL MULTIPLE DISC CLUTCH HUB

(a) Coat the 2 thrust bearing races with ATF and install them to the multiple disc clutch hub.

Text in Illustration

*1	Thrust Bearing Race C
*2	Thrust Bearing Race D



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race C	22.0 (0.866)	44.8 (1.764)
Thrust Bearing Race D	38.4 (1.512)	56.5 (2.224)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

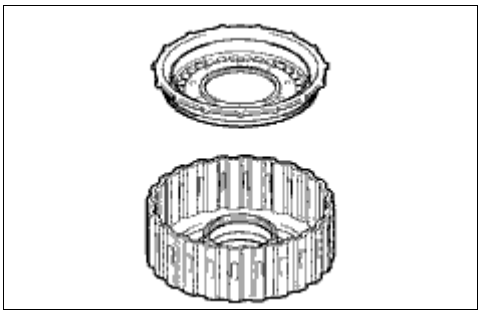
(b) Install the multiple disc clutch hub to the automatic transmission case sub-assembly.

33. INSTALL DIRECT CLUTCH PISTON

(a) Coat 2 new O-rings with ATF, and install them to the direct clutch piston.

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(b) Install the direct clutch piston to the direct clutch drum sub-assembly.

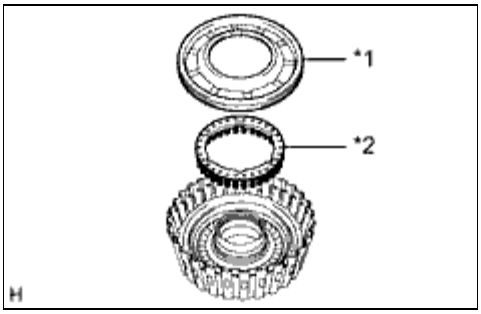


NOTICE:

Be careful not to damage the O-rings.

34. INSTALL NO. 2 CLUTCH BALANCER

(a) Install the direct clutch return spring sub-assembly to the direct clutch piston.



Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly

(b) Coat a new O-ring with ATF, and install it to the No. 2 clutch balancer.

(c) Install the No. 2 clutch balancer to the direct clutch drum sub-assembly.

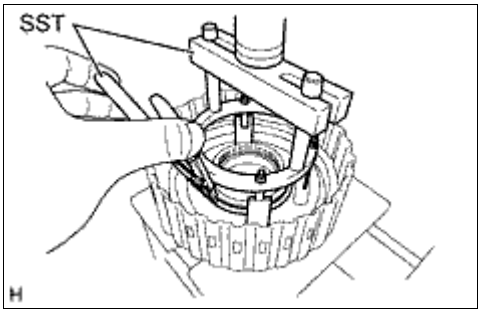
NOTICE:

Be careful not to damage the O-ring.

(d) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(e) Using SST, install the snap ring.

SST: 09350-30020

09350-07070

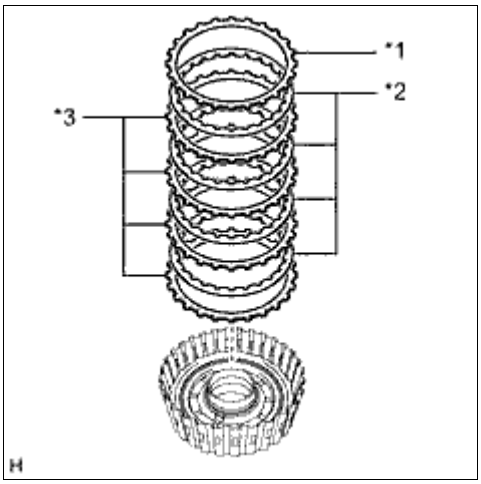
NOTICE:

Do not expand the snap ring excessively.

35. INSTALL NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

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(a) Install the 4 No. 2 clutch plates, 4 No. 2 clutch discs and direct clutch flange to the direct clutch drum sub-assembly.



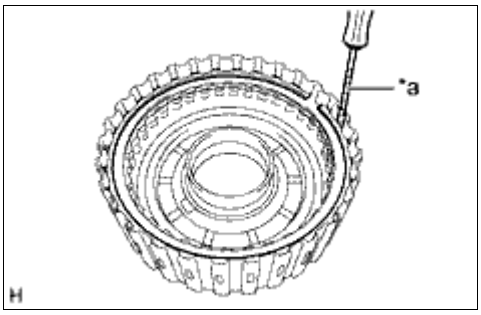
Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

NOTICE:

Make sure that the No. 2 clutch discs, No. 2 clutch plates and direct clutch flange are installed in the correct order.

(b) Using a screwdriver, install the snap ring to the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

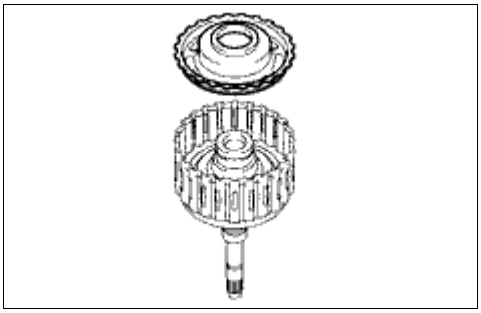
36. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

37. INSTALL FORWARD CLUTCH PISTON

(a) Coat a new O-ring with ATF, and install it to the input shaft sub-assembly.

(b) Coat a new O-ring with ATF, and install it to the forward clutch piston.

(c) Install the forward clutch piston to the input shaft sub-assembly.



NOTICE:

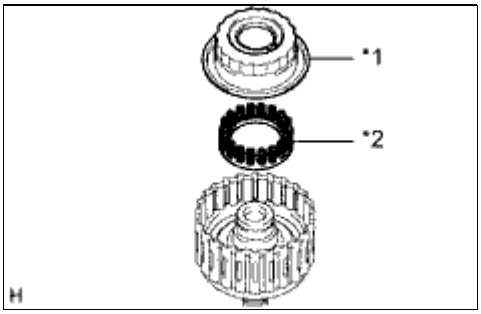
Be careful not to damage the O-rings.

38. INSTALL NO. 1 CLUTCH BALANCER

(a) Coat a new O-ring with ATF, and install it to the No. 1 clutch balancer.

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(b) Install the forward clutch return spring sub-assembly and No. 1 clutch balancer to the input shaft sub-assembly.



Text in Illustration

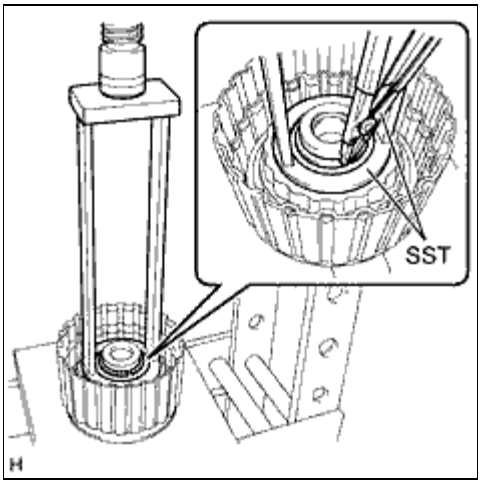
*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

NOTICE:

Be careful not to damage the O-ring.

(c) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(d) Using SST, install the snap ring.

SST: 09350-30020

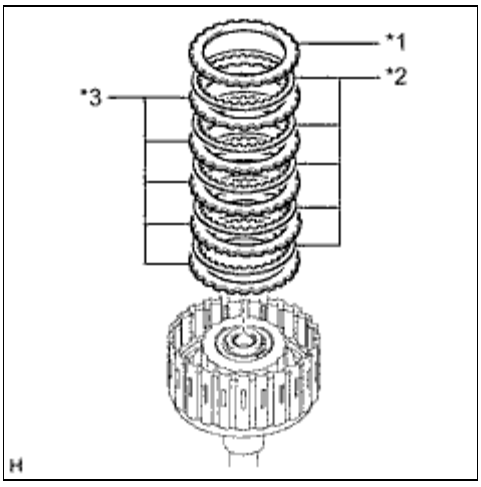
09350-07070

NOTICE:

Do not expand the snap ring excessively.

39. INSTALL NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Install the 5 No. 1 clutch plates, 5 No. 1 clutch discs and forward clutch flange to the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

NOTICE:

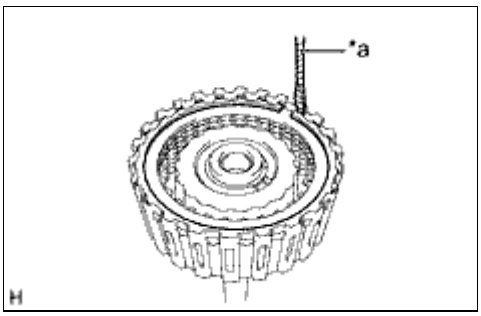
Make sure that the No. 1 clutch discs, No. 1 clutch plates and forward clutch flange are installed in the correct order.

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(b) Using a screwdriver, install the snap ring.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the input shaft sub-assembly.

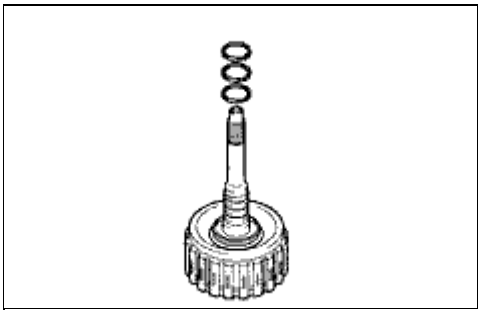
HINT:

Tape the screwdriver tip before use.

40. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH DISC) INFO

41. INSTALL CLUTCH DRUM OIL SEAL RING

(a) Coat 3 new clutch drum oil seal rings with ATF and install them to the input shaft sub-assembly.



NOTICE:

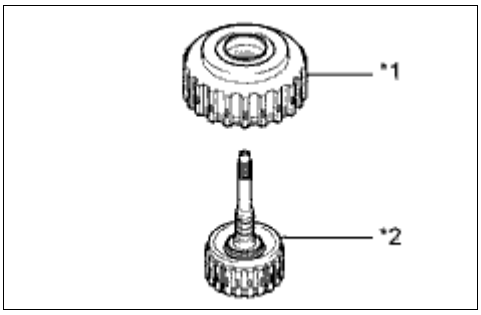
Do not expand the clutch drum oil seal ring ends excessively.

HINT:

After installing the clutch drum oil seal rings, check that they rotate smoothly.

42. INSTALL DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Install the direct clutch drum sub-assembly to the input shaft sub-assembly.



Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly

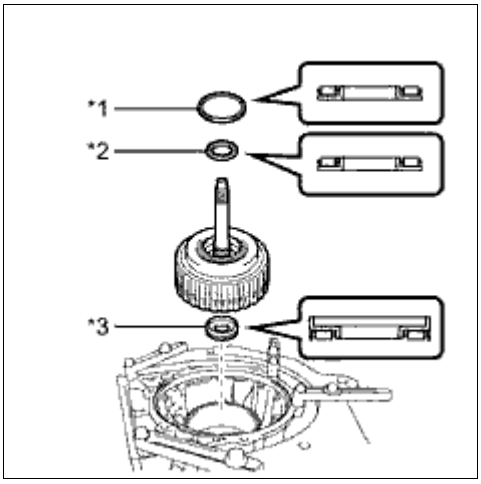
43. INSTALL CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

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(a) Coat the 3 thrust needle roller bearings with ATF and install them to the clutch drum and input shaft assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing A
*2	Thrust Needle Roller Bearing B
*3	Thrust Needle Roller Bearing C



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing A	71.9 (2.831)	85.6 (3.370)
Thrust Needle Roller Bearing B	34.6 (1.362)	52.0 (2.047)
Thrust Needle Roller Bearing C	21.3 (0.839)	41.1 (1.618)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

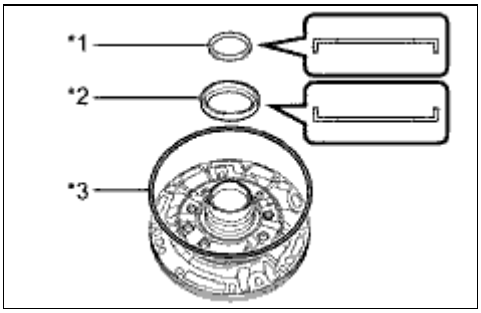
(b) Install the clutch drum and input shaft assembly to the automatic transmission case sub-assembly.

44. INSTALL OIL PUMP ASSEMBLY

(a) Coat the 2 thrust bearing races with ATF and install them to the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race B
*2	Thrust Bearing Race A
*3	Oil Pump O-ring



Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race B	40.0 (1.575)	52.8 (2.079)
Thrust Bearing Race A	74.2 (2.921)	87.74 (3.454)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

(b) Coat a new oil pump O-ring with ATF, and install it to the oil pump assembly.

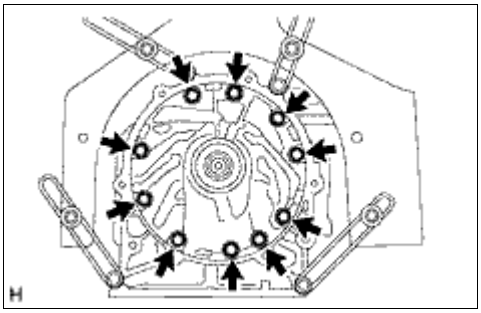
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(c) Set the oil pump assembly on the input shaft, and align the bolt holes of the oil pump assembly with the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the oil pump O-ring.

(d) Temporarily install the oil pump assembly to the automatic transmission case sub-assembly.

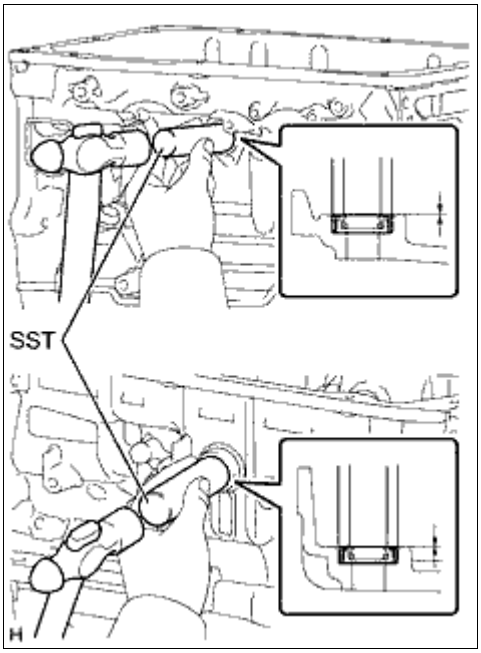


(e) Install the oil pump assembly with the 10 bolts.

Torque:

21 N·m {215 kgf·cm, 16ft·lbf}

45. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL



(a) Using SST and a hammer, drive in 2 new manual valve lever shaft oil seals to the automatic transmission case sub-assembly.

SST: 09350-30020

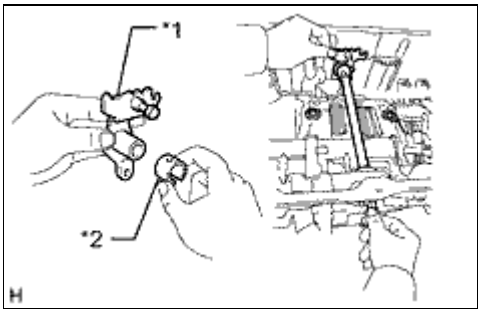
09350-07110

Standard depth:

-0.5 to 0.5 mm (-0.0196 to 0.0196 in.)

(b) Coat the lip of the manual valve lever shaft oil seal with MP grease.

46. INSTALL MANUAL VALVE LEVER SUB-ASSEMBLY



(a) Install a new spacer to the manual valve lever sub-assembly.

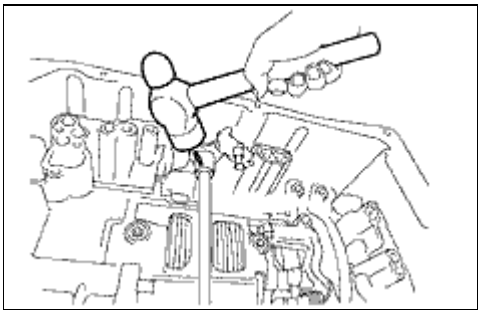
Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Spacer

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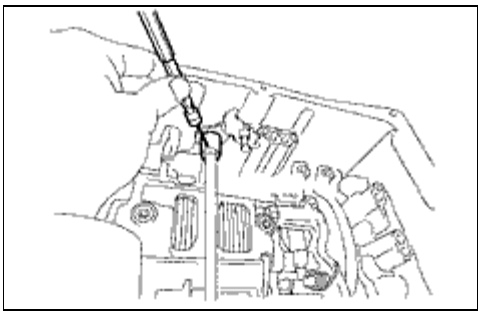
(b) Install the manual valve lever shaft to the automatic transmission case sub-assembly through the manual valve lever sub-assembly.

(c) Using a hammer, drive in a new spring pin.



(d) Turn the spacer and manual valve lever shaft to align the smaller hole on the spacer with the indent on the manual valve lever sub-assembly.

(e) Using a 3 mm pin punch and a hammer, stake the spacer.



(f) Check that the spacer does not turn.

(g) Make sure that the shaft rotates smoothly.

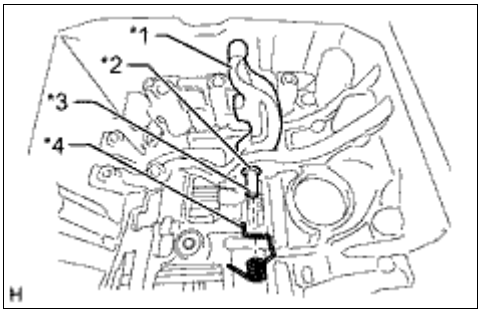
47. INSTALL PARKING LOCK PAWL SHAFT

(a) Install the E-ring to the parking lock pawl shaft.

(b) Install the parking lock pawl, parking lock pawl shaft and spring to the automatic transmission case sub-assembly.

Text in Illustration

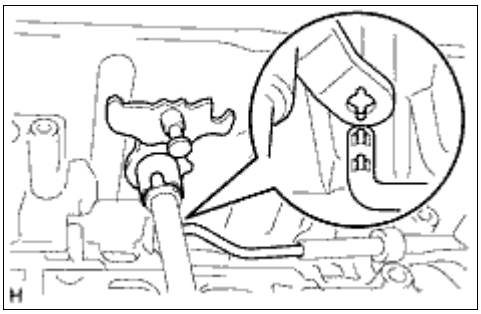
*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring



48. INSTALL PARKING LOCK ROD SUB-ASSEMBLY

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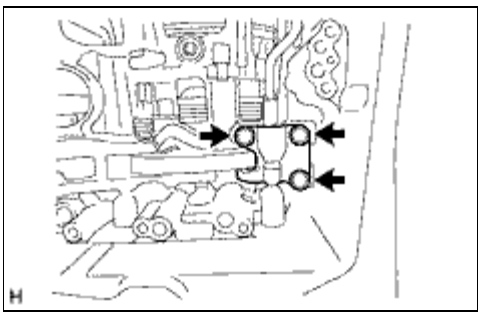
(a) Install the parking lock rod sub-assembly to the manual valve lever sub-assembly.



49. INSTALL PARKING LOCK PAWL BRACKET

(a) Install the parking lock pawl bracket to the automatic transmission case sub-assembly with the 3 bolts.

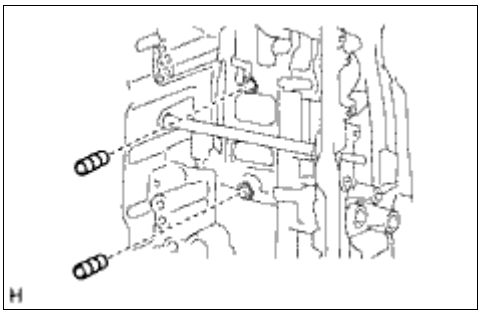
Torque:
18 N·m {184 kgf·cm, 13ft·lbf}



(b) Move the manual valve lever sub-assembly to P, and check the output shaft is locked by the parking lock pawl.

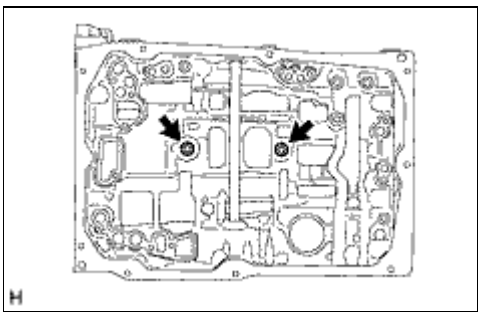
50. INSTALL BRAKE DRUM GASKET

(a) Coat 2 new brake drum gaskets with ATF and install them to the automatic transmission case sub-assembly.



51. INSTALL TRANSMISSION CASE GASKET

(a) Coat 2 new transmission case gaskets with ATF and install them to the automatic transmission case sub-assembly.



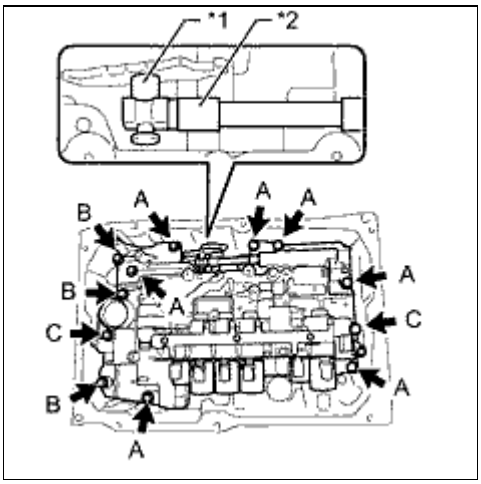
52. INSTALL TRANSMISSION VALVE BODY ASSEMBLY

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(a) Insert the manual valve lever sub-assembly into the groove on the end of the manual valve and install the transmission valve body assembly to the automatic transmission case sub-assembly with the 12 bolts.

Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Manual Valve



Torque:

11 N·m {112 kgf·cm, 8ft·lbf}

HINT:

Each bolt length is indicated below.

Bolt length:

Bolt A

25 mm (0.984 in.)

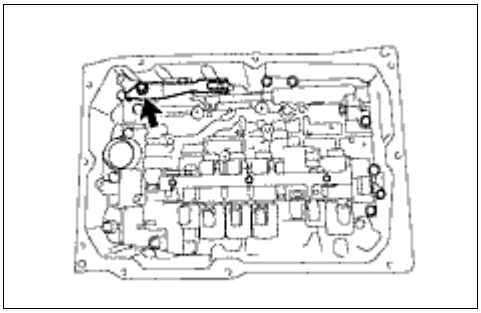
Bolt B

36 mm (1.42 in.)

Bolt C

50 mm (1.97 in.)

(b) Install the detent spring and detent spring cover to the transmission valve body assembly with the bolt.



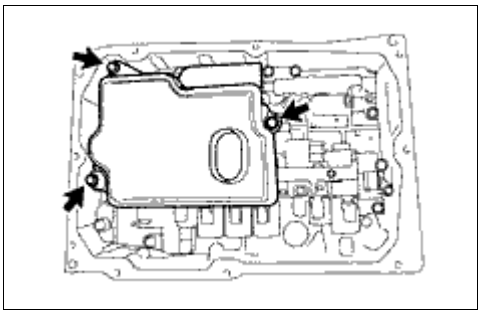
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

53. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the valve body oil strainer assembly.

(b) Install the valve body oil strainer assembly to the transmission valve body assembly with the 3 bolts.



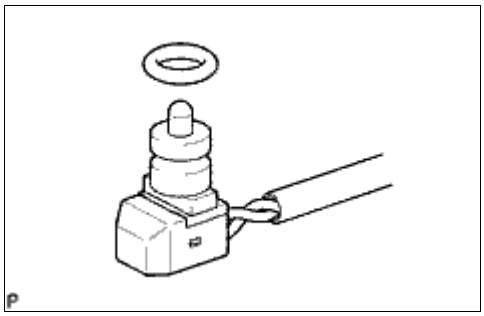
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

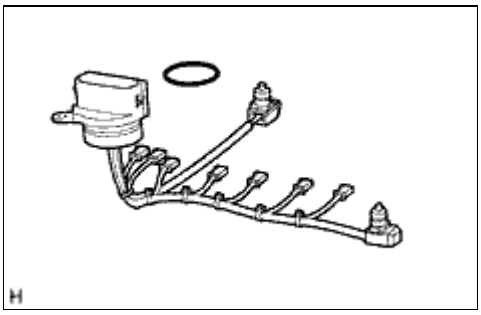
54. INSTALL TRANSMISSION WIRE

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(a) Coat 2 new O-rings with ATF, and install them to the 2 temperature sensors.



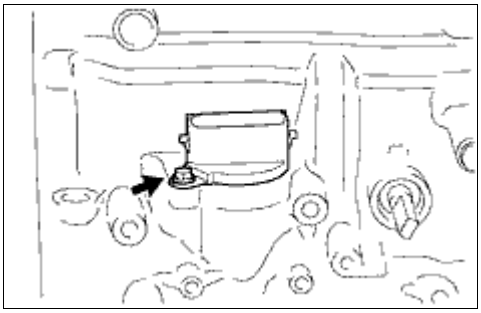
(b) Coat a new O-ring with ATF, and install it to the transmission wire.



(c) Install the transmission wire to the automatic transmission case sub-assembly with the bolt.

Torque:

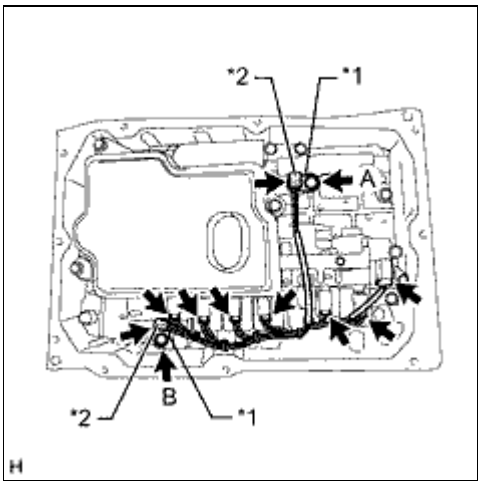
5.4 N·m {55 kgf·cm, 48in·lbf}



(d) Connect the 7 solenoid valve connectors.

Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor



(e) Install the 2 temperature sensors and 2 temperature sensor clamps to the transmission valve body assembly with the bolt.

Torque:

for Bolt A -

10 N·m {102 kgf·cm, 7ft·lbf}

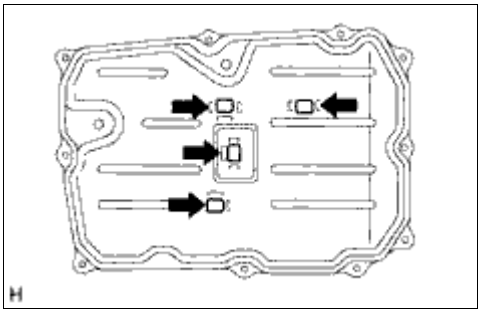
for Bolt B -

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11 N·m {112 kgf·cm, 8ft·lbf}

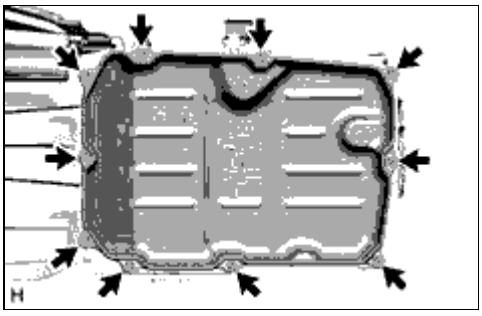
55. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Install the 4 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly as shown in the illustration.



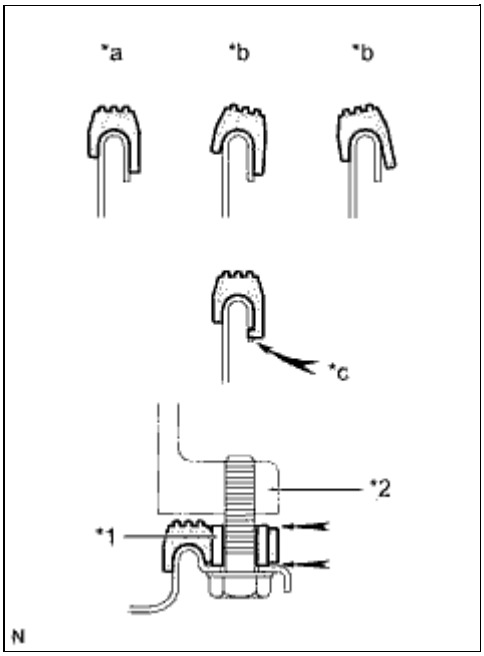
(b) Install a new automatic transmission oil pan gasket to the automatic transmission oil pan sub-assembly.

(c) Install the automatic transmission oil pan sub-assembly with automatic transmission oil pan gasket to the automatic transmission case sub-assembly with the 10 bolts.



Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}



Text in Illustration

*1	Sleeve
*2	Automatic Transmission Case Sub-assembly

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*a	Correct
*b	Incorrect
*c	Protrusion

NOTICE:

- Make sure that automatic transmission oil pan gasket seal surface and automatic transmission oil pan sub-assembly contact surface are free of oil and foreign matter.
- Install the automatic transmission oil pan gasket so that there is no slack in the automatic transmission oil pan gasket, and the entire seal surface is level.
- Make sure that the 8 protrusions are properly engaged to the automatic transmission oil pan sub-assembly.
- When installing the automatic transmission oil pan sub-assembly, make sure that the automatic transmission oil pan gasket is not pinched between the sleeve and the seal surface of the automatic transmission case sub-assembly.

(d) Install the drain plug and a new gasket to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

(e) Using a 5 mm hexagon socket wrench, install a new gasket and overflow plug to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

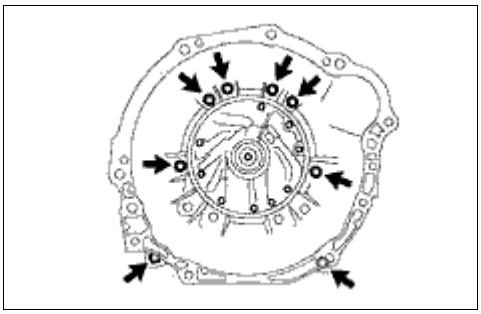
56. INSTALL AUTOMATIC TRANSMISSION HOUSING

(a) Clean and degrease the bolts and bolt holes with non-residue solvent.

(b) Install the automatic transmission housing to the automatic transmission case sub-assembly with the 8 bolts.

Torque:

34 N·m {346 kgf·cm, 25ft·lbf}



(c) Apply adhesive to 2 or 3 threads on the end of the 4 bolts.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(d) Install 4 bolts to the automatic transmission housing.

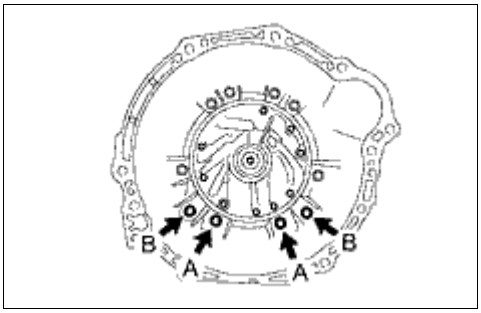
Torque:

for Bolt A (M10 bolt) -

34 N·m {346 kgf·cm, 25ft·lbf}

for Bolt B (M12 bolt) -

57 N·m {579 kgf·cm, 42ft·lbf}



57. INSTALL AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

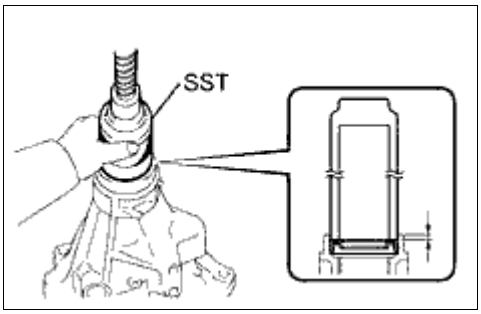
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(a) Using SST and a press, install a new automatic transmission extension housing oil seal to the extension housing sub-assembly.

SST: 09309-37010

Standard depth:

5.4 to 5.8 mm (0.213 to 0.228 in.)



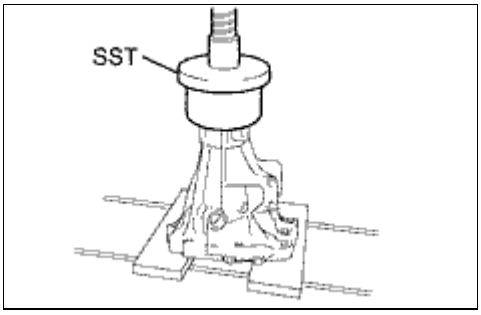
(b) Coat the lip of the automatic transmission extension housing oil seal with MP grease.

58. INSTALL EXTENSION HOUSING DUST DEFLECTOR

(a) Using SST and a press, install a new extension housing dust deflector to the extension housing sub-assembly.

SST: 09550-55011

09550-05081



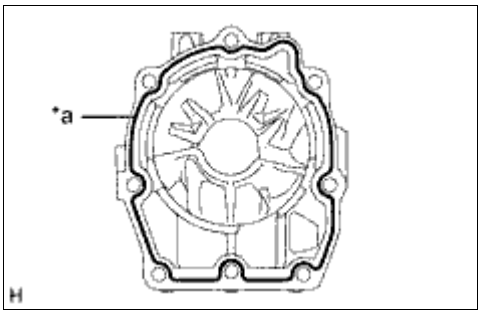
59. INSTALL EXTENSION HOUSING SUB-ASSEMBLY

(a) Clean and degrease the threads of the 8 bolts, bolt holes and the contact surfaces of the automatic transmission case sub-assembly and extension housing sub-assembly with non-residue solvent.

(b) Apply seal packing to the extension housing sub-assembly as shown in the illustration.

Text in Illustration

*a	Seal Packing



Seal packing:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

- Apply seal packing in a continuous line (width 1.2 mm (0.0472 in.)) along the sealing surface.
- After applying seal packing, install the extension housing sub-assembly to the automatic transmission case sub-assembly within 3 minutes and tighten the bolts within 10 minutes.

(c) Apply adhesive to 2 or 3 threads on the end of the 8 bolts.

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

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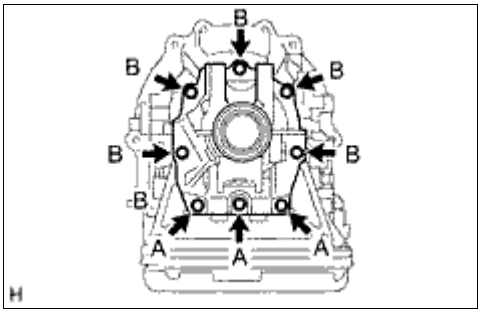
(d) Install the extension housing sub-assembly to the automatic transmission case sub-assembly with the 8 bolts.

Torque:

34 N·m {346 kgf·cm, 25ft·lbf}

Bolt Length:

Bolt A	40 mm (1.57 in.)
Bolt B	45 mm (1.77 in.)



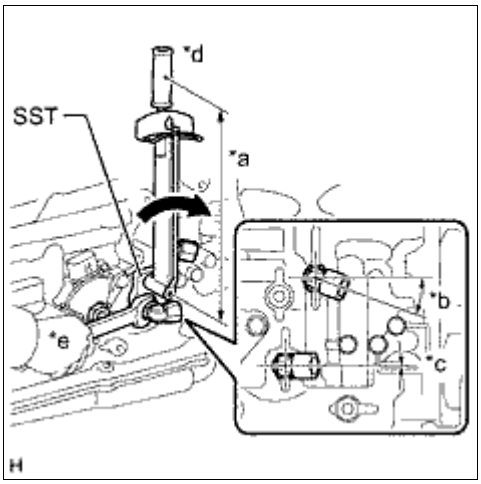
60. INSTALL OIL COOLER TUBE UNION

(a) Coat 2 new O-rings with ATF and install them to the 2 oil cooler tube unions.

(b) Using SST, install the 2 oil cooler tube unions to the automatic transmission case sub-assembly.

Text in Illustration

*a	Torque Wrench Fulcrum Length
*b	18° to 22°
*c	-2° to 2°
*d	Turn
*e	Hold



SST: 09268-78010

Torque:

29 N·m {300 kgf·cm, 22ft·lbf}

HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using SST (fulcrum length of 34.5 mm (1.36 in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 25 N*m (252 kgf*cm, 18 ft.*lbf)

61. INSTALL AUTOMATIC TRANSMISSION CASE PLUG

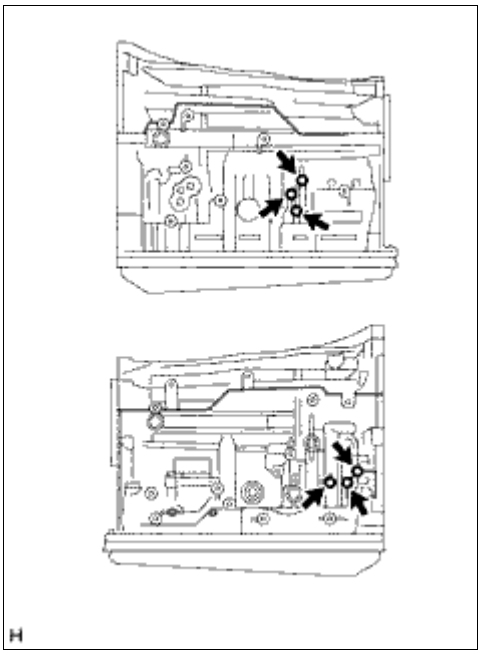
(a) Coat 6 new O-rings with ATF, and install them to the 6 automatic transmission case plugs.

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(b) Install the 6 automatic transmission case plugs to the automatic transmission case sub-assembly.

Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}

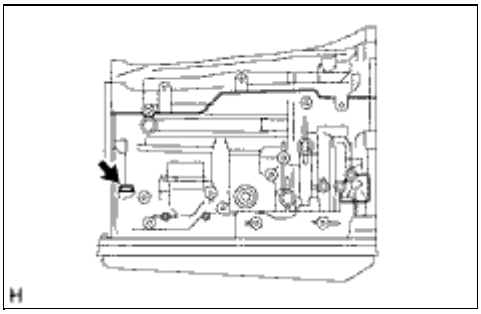


(c) Coat a new O-ring with ATF, and install it to the automatic transmission case plug.

(d) Using a T55 "TORX" socket wrench, install the automatic transmission case plug to the automatic transmission case sub-assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



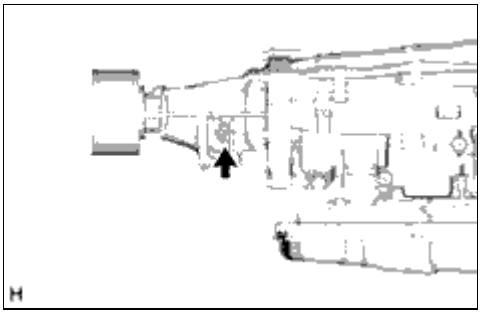
62. INSTALL REFILL PLUG

(a) Coat a new O-ring with ATF, and install it to the refill plug.

(b) Install the refill plug to the extension housing sub-assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



63. INSTALL PARK/NEUTRAL POSITION SWITCH

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

(a) Clean the bolt and bolt hole.

(b) Apply adhesive to 2 or 3 threads on the end of the bolt.

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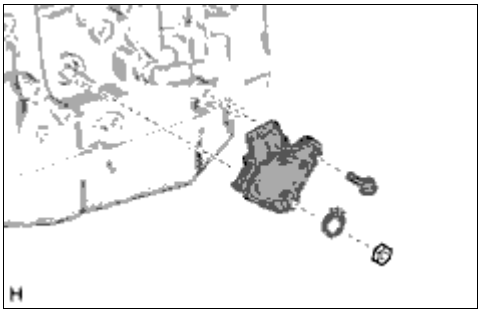
Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

Install the bolt within 3 minutes of applying adhesive.

(c) Temporarily install the park/neutral position switch to the automatic transmission case sub-assembly with the bolt.



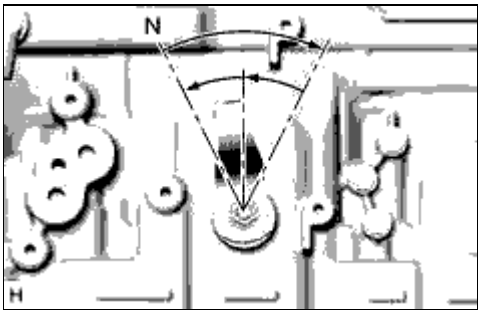
(d) Install a lock washer and nut to the park/neutral position switch.

Torque:

6.9 N·m {70 kgf·cm, 61in·lbf}

(e) Temporarily install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

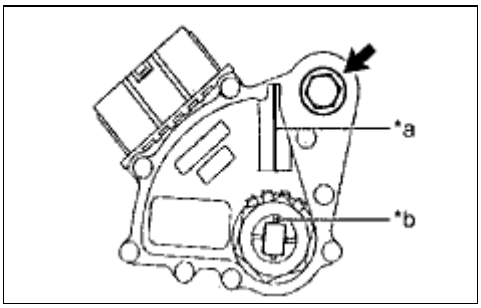
(f) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(g) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.

Text in Illustration

*a	Neutral Basic Line
*b	Groove



Torque:

13 N·m {131 kgf·cm, 9ft·lbf}

(h) Using a screwdriver, bend the tabs of the lock washer.

NOTICE:

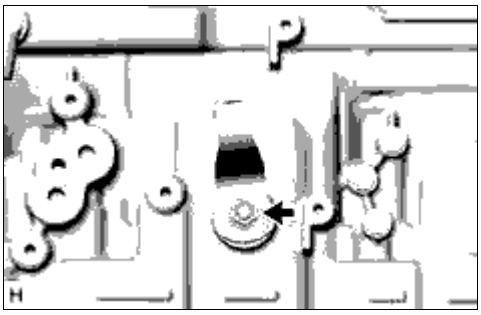
- Be careful not to damage the park/neutral position switch.
- Bend at least 2 of the lock washer tabs.

HINT:

Tape the screwdriver tip before use.

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64. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH

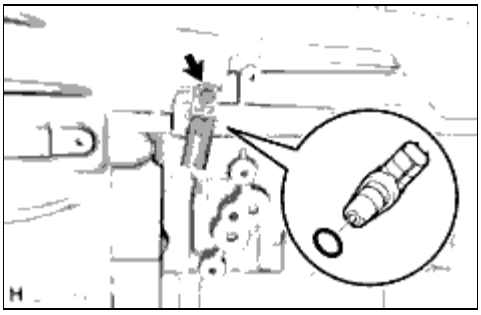


(a) Install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

Torque:

16 N·m {160 kgf·cm, 12ft·lbf}

65. INSTALL TRANSMISSION REVOLUTION SENSOR

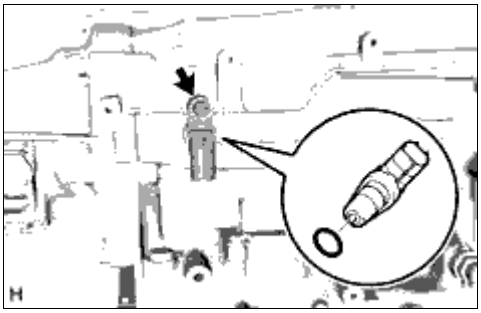


(a) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (NT).

(b) Install the transmission revolution sensor (NT) to the automatic transmission case sub-assembly with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}



(c) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (SP2).

(d) Install the transmission revolution sensor (SP2) to the automatic transmission case sub-assembly with the bolt.

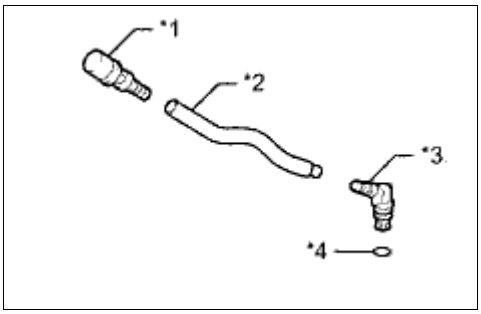
Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

66. INSTALL BREATHER PLUG HOSE

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(a) Install the breather plug sub-assembly and breather plug to the breather plug hose.

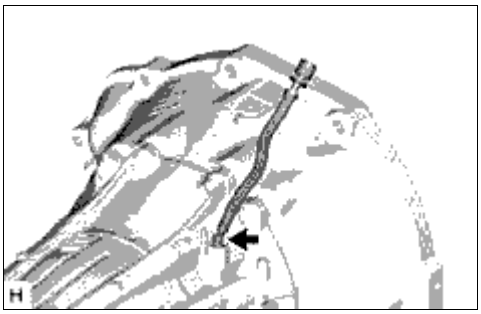


Text in Illustration

*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring

(b) Coat a new O-ring with ATF, and install it to the breather plug.

(c) Install the breather plug hose to the automatic transmission case sub-assembly.



NOTICE:

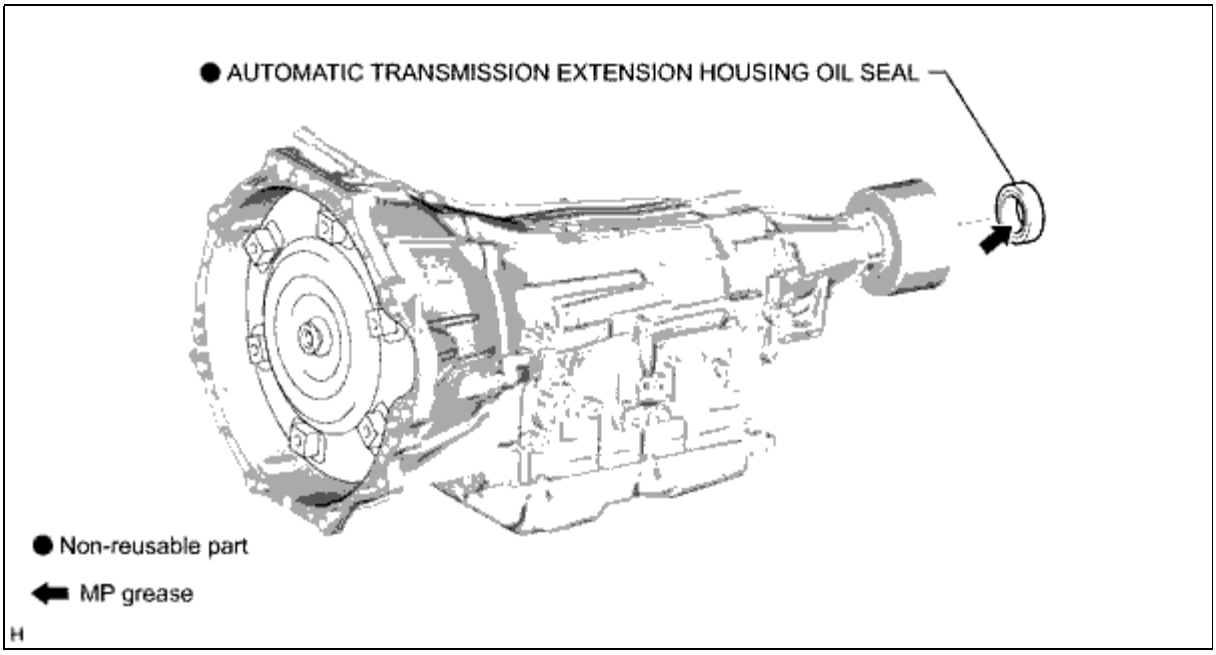
Be careful not to damage the O-rings.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000NRX024X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: EXTENSION HOUSING REAR OIL SEAL: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000NRY02GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: EXTENSION HOUSING REAR OIL SEAL: REPLACEMENT; 2016 MY Tacoma [08/2015 -]		

REPLACEMENT

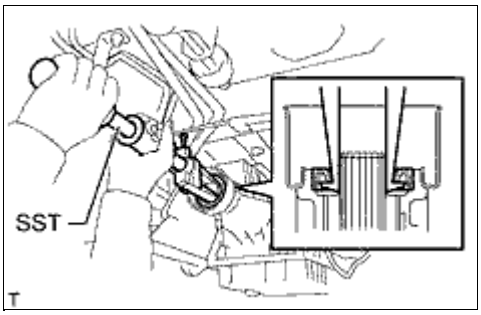
1. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

2. REMOVE AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

(a) Using SST, remove the automatic transmission extension housing oil seal.

SST: 09308-00010



3. INSTALL AUTOMATIC TRANSMISSION EXTENSION HOUSING OIL SEAL

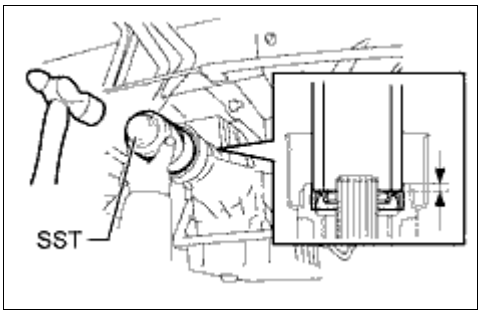
(a) Coat the lip of a new automatic transmission extension housing oil seal with MP grease.

(b) Using SST and a hammer, drive in the automatic transmission extension housing oil seal.

SST: 09309-37010

Standard depth:

5.4 to 5.8 mm (0.213 to 0.228 in.)



NOTICE:

- Keep the lip free of foreign matter.
- Do not tap the automatic transmission extension housing oil seal at an angle.

4. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

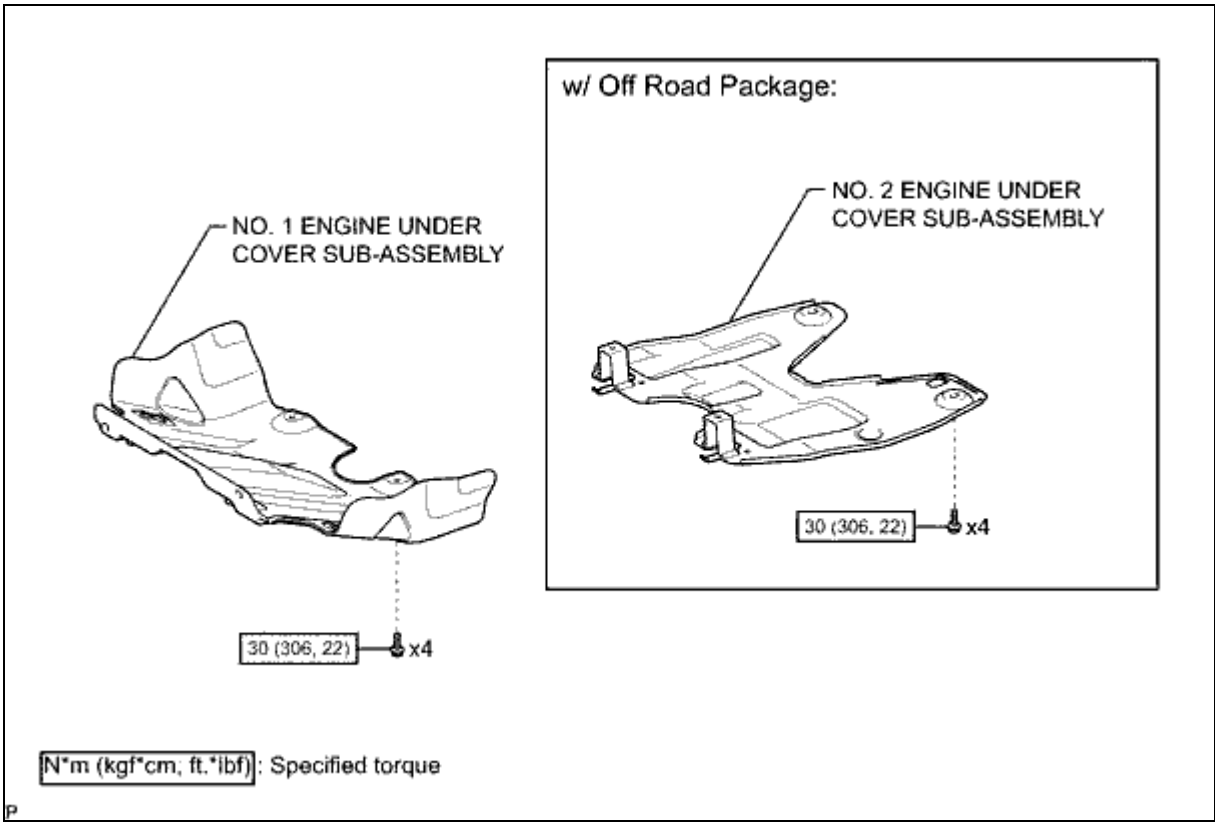
INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000001BZC03JX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL COOLER (for 2GR-FKS): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

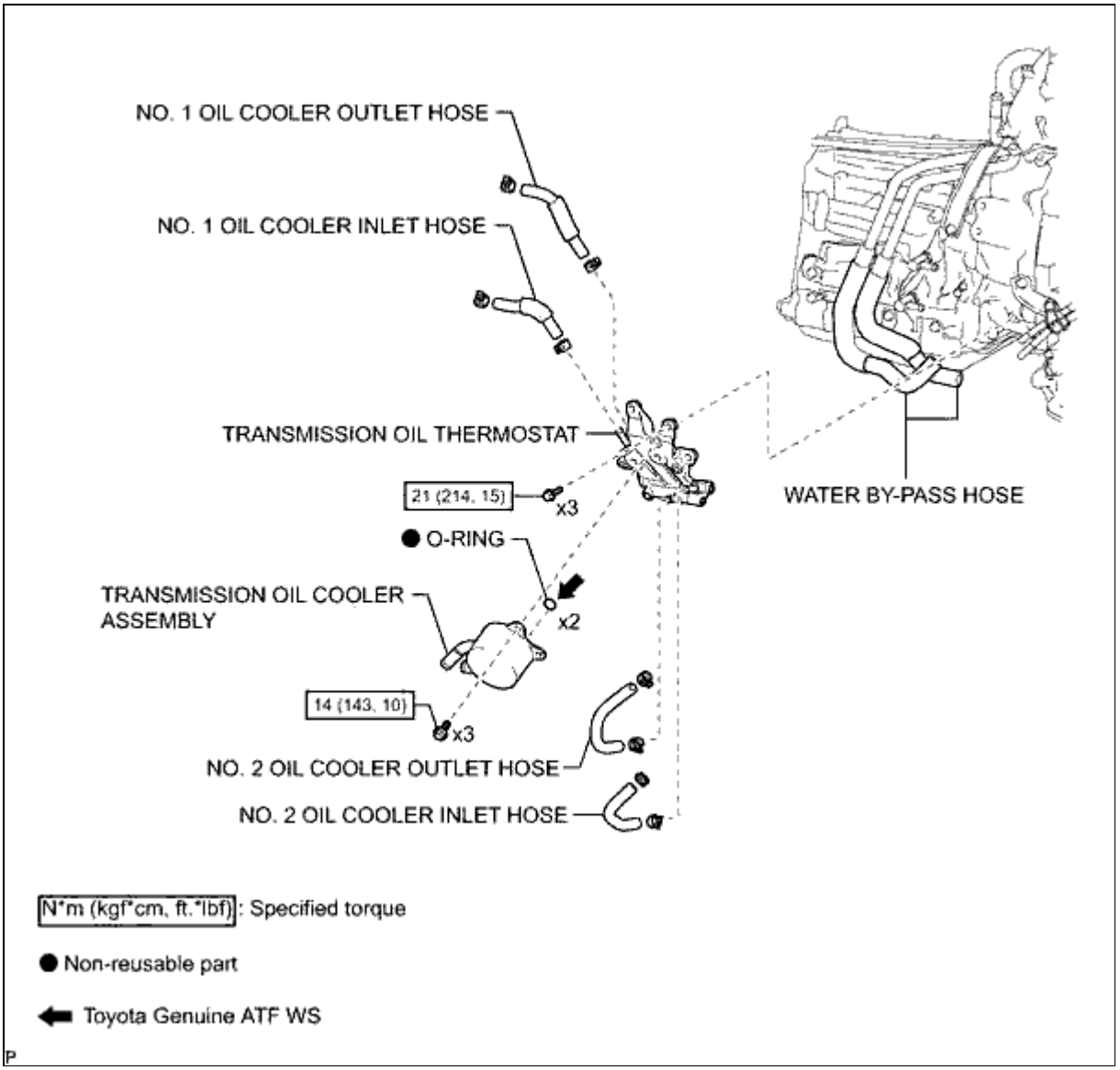
COMPONENTS

ILLUSTRATION



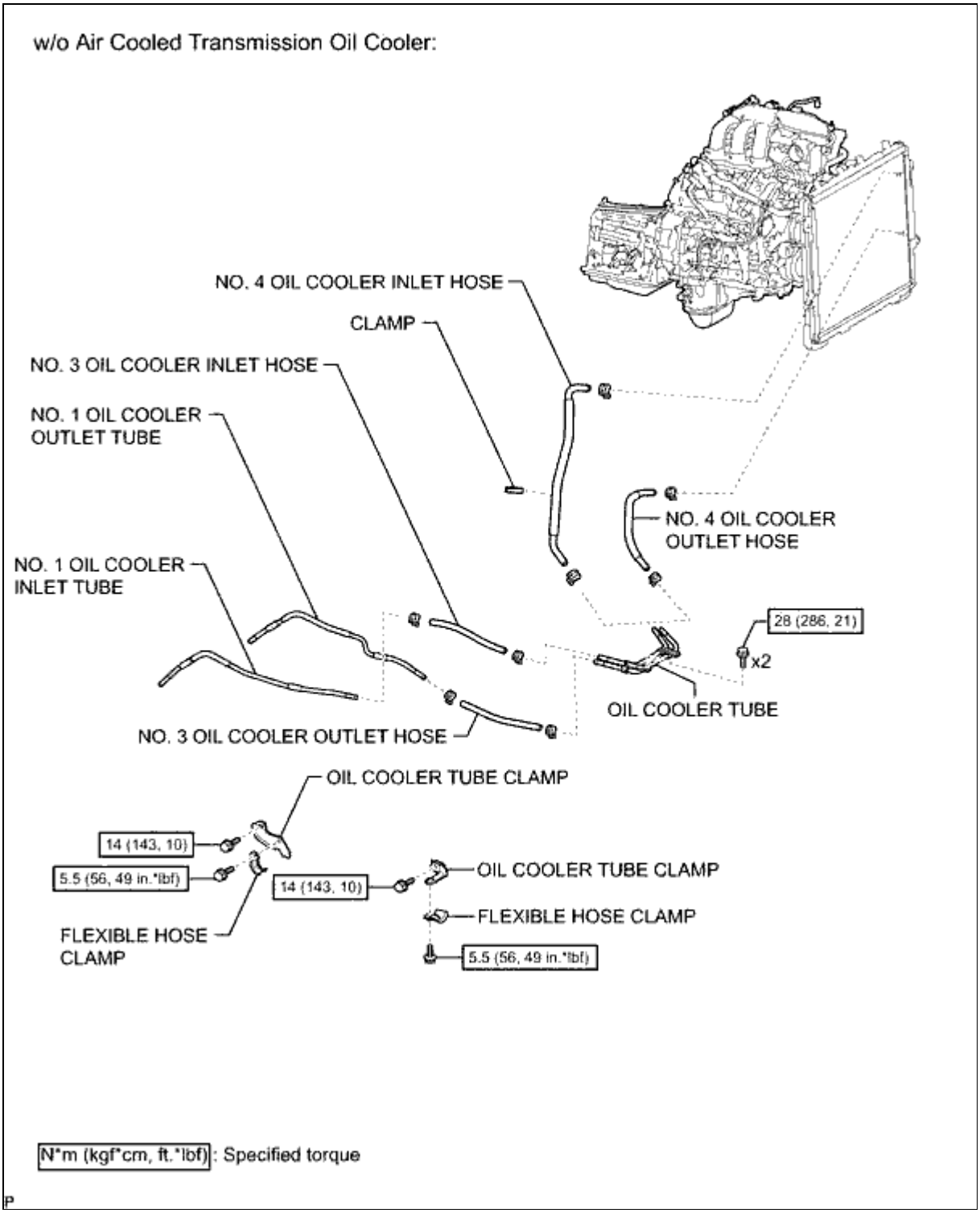
ILLUSTRATION

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ILLUSTRATION

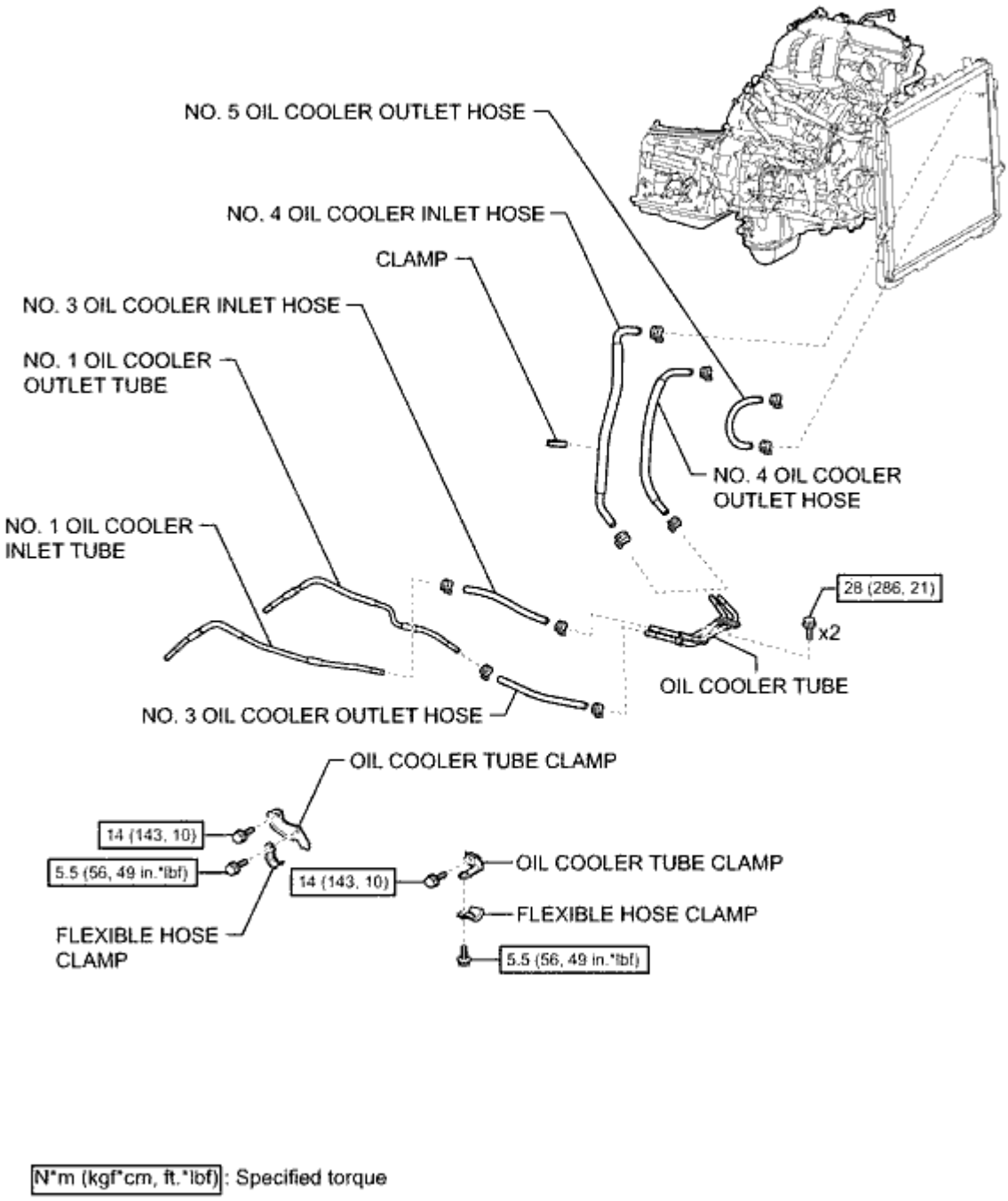
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ILLUSTRATION

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w/ Air Cooled Transmission Oil Cooler:



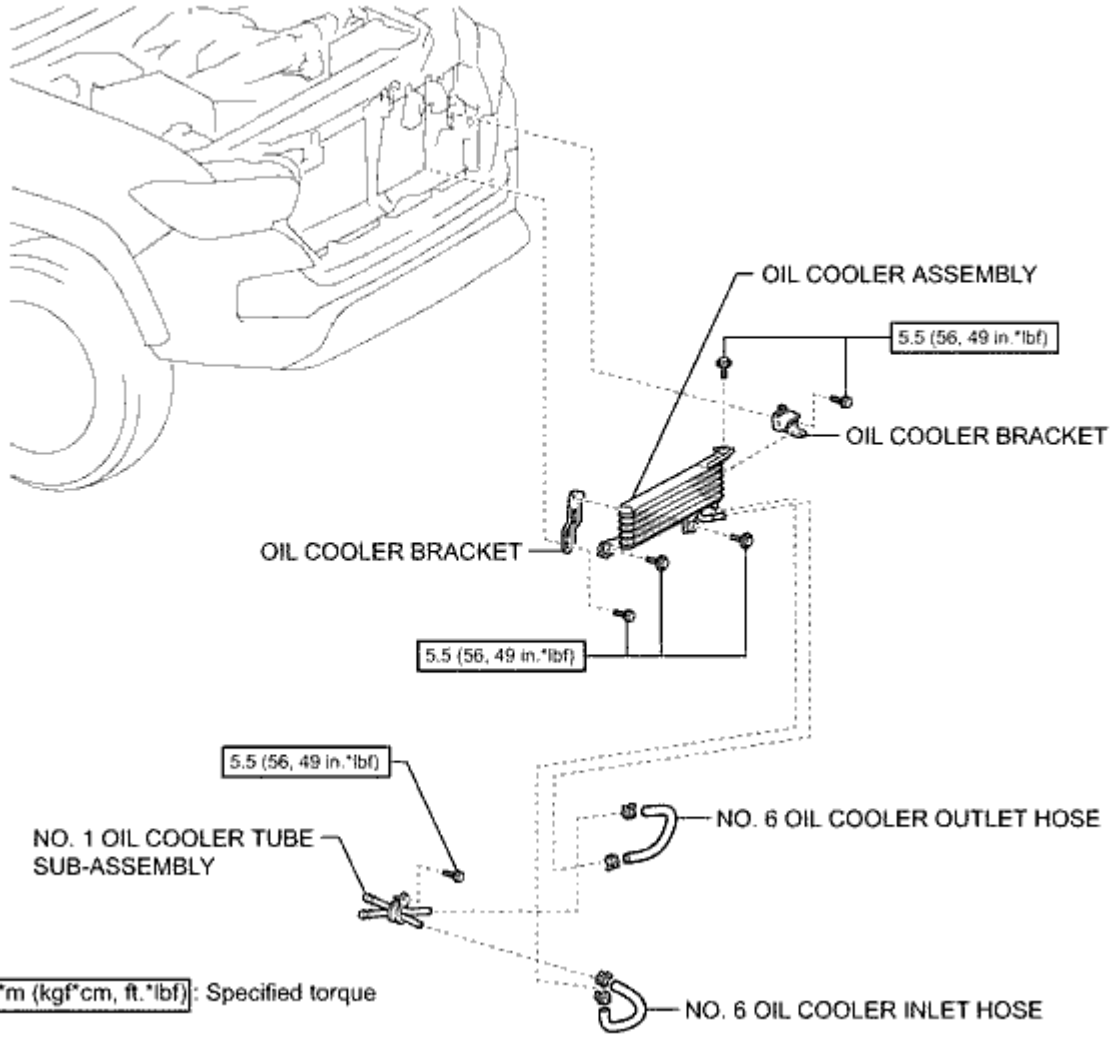
N*m (kgf*cm, ft.*lbf): Specified torque

P

ILLUSTRATION

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w/ Air Cooled Transmission Oil Cooler:



P

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000001BZB04ZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL COOLER (for 2GR-FKS): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL OIL COOLER ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

(a) Install the 2 oil cooler brackets to the oil cooler assembly with the 2 bolts.

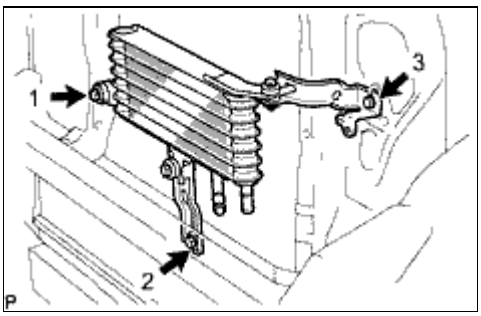
Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(b) Install the oil cooler assembly to the vehicle body with the 3 bolts in the order shown in the illustration.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}



2. INSTALL NO. 1 OIL COOLER TUBE SUB-ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

(a) Install the No.1 oil cooler tube sub-assembly to the oil cooler bracket with the bolt.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

3. INSTALL NO. 6 OIL COOLER INLET HOSE AND NO. 6 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose to the oil cooler assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose to the No.1 oil cooler tube sub-assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

4. INSTALL OIL COOLER TUBE

(a) Install the oil cooler tube to the vehicle body with the 2 bolts.

Torque:

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28 N·m {286 kgf·cm, 21ft·lbf}

5. INSTALL NO. 5 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 5 oil cooler outlet hose to the No.1 oil cooler tube sub-assembly, and slide the clip to secure it.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 5 oil cooler outlet hose to the radiator assembly, and slide the clip to secure it.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

6. INSTALL NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) w/o Air Cooled Transmission Oil Cooler:

(1) Install the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the radiator assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) w/ Air Cooled Transmission Oil Cooler:

(1) Install the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the radiator assembly and No.1 oil cooler tube sub-assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(c) Connect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(d) Then pass the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose through the clamp and close the clamp.

7. INSTALL NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

(a) Install the 2 oil cooler tube clamps to the automatic transmission assembly and engine assembly with the 2 bolts.

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Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Install the No. 1 oil cooler inlet tube, No. 1 oil cooler outlet tube and 2 flexible hose clamps to the 2 oil cooler tube clamps with the 2 bolts.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

8. INSTALL NO. 3 OIL COOLER INLET HOSE AND NO. 3 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose to the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

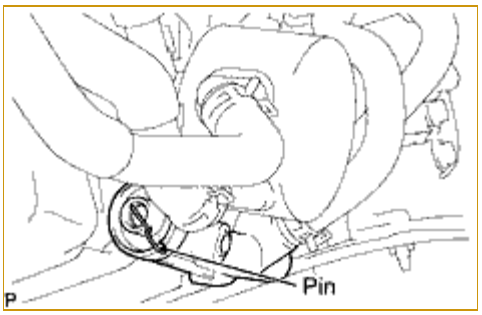
NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

9. INSTALL TRANSMISSION OIL COOLER ASSEMBLY

NOTICE:

- When the transmission oil thermostat is replaced with a new one, pull out the pin from the new transmission oil thermostat.



- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Coat 2 new O-rings with ATF, and install them to the transmission oil cooler assembly.

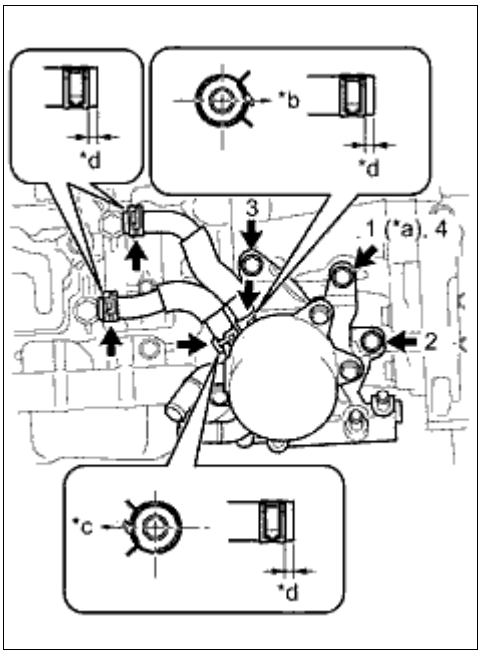
(b) Align the transmission oil cooler assembly with the transmission oil thermostat and assemble them with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

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(c) Install the transmission oil cooler assembly with transmission oil thermostat to the automatic transmission assembly with the 3 bolts in the order shown in the illustration.



Text in Illustration

*a	Temporarily Tighten
*b	Front Side
*c	Rear Side
*d	2 to 7 mm (0.0788 to 0.2755 in.)

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

(d) Install the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the transmission oil thermostat, and slide the 2 clips to secure them.

NOTICE:

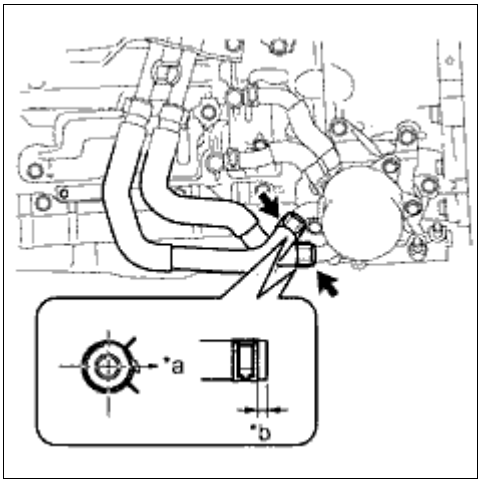
Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(e) Connect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the automatic transmission assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(f) Connect the 2 water by-pass hoses to the transmission oil cooler assembly, and slide the 2 clips to secure them.



Text in Illustration

*a	RH Side
*b	2 to 7 mm (0.0788 to 0.2755 in.)

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

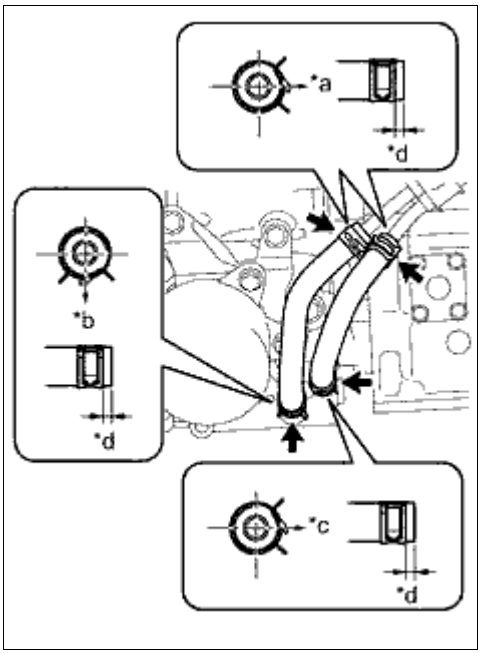
10. INSTALL NO. 2 OIL COOLER INLET HOSE AND NO. 2 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

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(a) Install the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose to the transmission oil thermostat, and slide the 2 clips to secure them.



Text in Illustration

*a	RH Side
*b	Lower Side
*c	Front Side
*d	2 to 7 mm (0.0788 to 0.2755 in.)

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose to the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

11. INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

12. INSTALL RADIATOR GRILLE

INFO

13. ADD ENGINE COOLANT INFO

14. ADD AUTOMATIC TRANSMISSION FLUID

INFO

15. INSPECT FOR COOLANT LEAK INFO

16. INSPECT FOR AUTOMATIC TRANSMISSION FLUID LEAK

17. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

18. INSTALL NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000001BZD04UX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL COOLER (for 2GR-FKS): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. REMOVE NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

2. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

3. DRAIN ENGINE COOLANT INFO

4. REMOVE RADIATOR GRILLE

INFO

5. REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

6. REMOVE NO. 2 OIL COOLER INLET HOSE AND NO. 2 OIL COOLER OUTLET HOSE

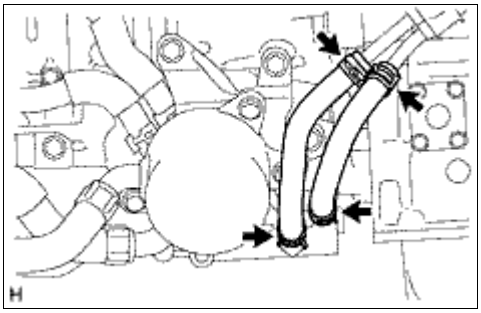
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

(a) Slide the 2 clips and disconnect the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose from the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.



(b) Slide the 2 clips and remove the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose from the transmission oil thermostat.

7. REMOVE TRANSMISSION OIL COOLER ASSEMBLY

NOTICE:

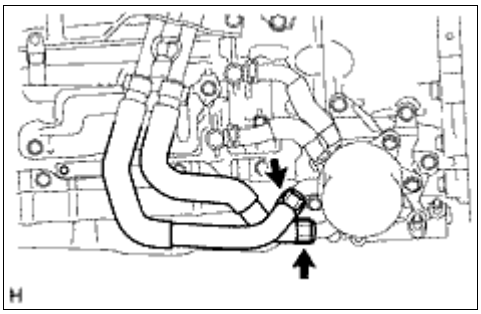
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

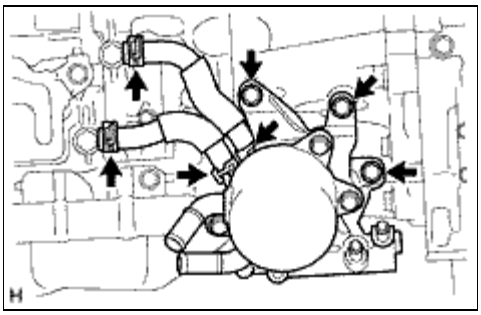
Use a container to catch any ATF and coolant.

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(a) Slide the 2 clips and disconnect the 2 water by-pass hoses from the transmission oil cooler assembly.



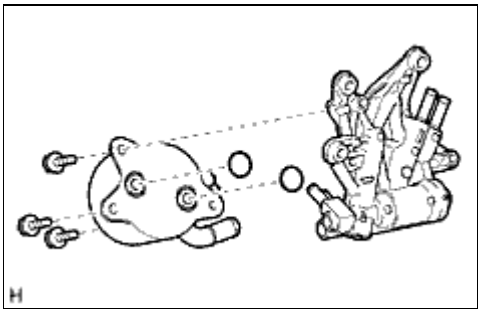
(b) Slide the 2 clips and disconnect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the automatic transmission assembly.



(c) Slide the 2 clips and remove the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the transmission oil thermostat.

(d) Remove the 3 bolts and transmission oil cooler assembly with transmission oil thermostat from the automatic transmission assembly.

(e) Remove the 3 bolts and transmission oil cooler assembly from the transmission oil thermostat.



(f) Remove the 2 O-rings from the grooves of transmission oil cooler assembly.

8. REMOVE NO. 3 OIL COOLER INLET HOSE AND NO. 3 OIL COOLER OUTLET HOSE

NOTICE:

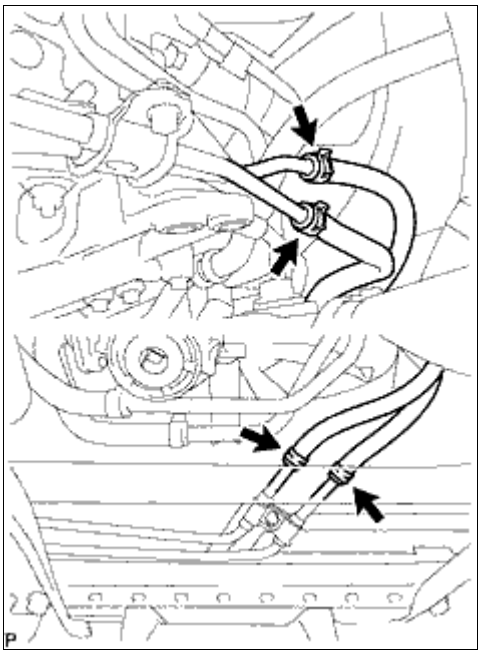
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

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(a) Slide the 2 clips and disconnect the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose from the oil cooler tube.



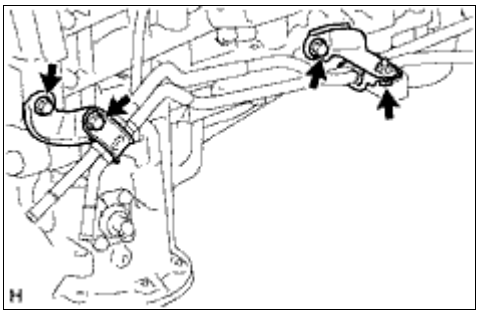
(b) Slide the 2 clips and remove the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose from the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.

9. REMOVE NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

HINT:

Use a container to catch any ATF.

(a) Remove the 2 bolts, 2 flexible hose clamps, No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.



(b) Remove the 2 bolts and 2 oil cooler tube clamps from the automatic transmission assembly and engine assembly.

10. REMOVE NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

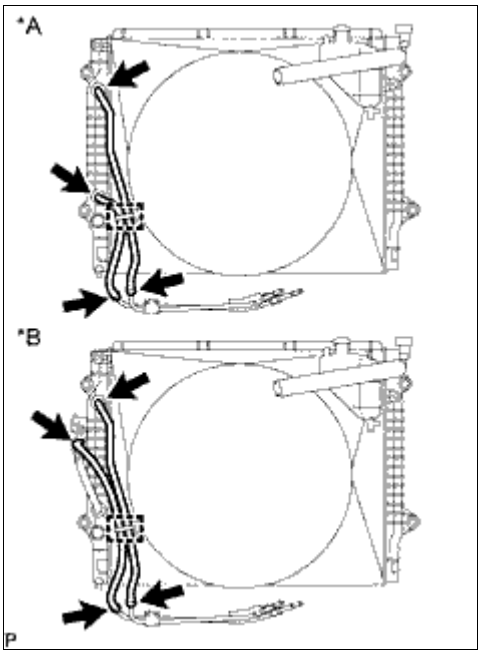
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

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(a) Detach the claw to open the clamp.



Text in Illustration

*A	w/o Air Cooled Transmission Oil Cooler
*B	w/ Air Cooled Transmission Oil Cooler

(b) Slide the 2 clips and disconnect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the oil cooler tube.

(c) w/o Air Cooled Transmission Oil Cooler:

(1) Slide the 2 clips and remove the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the radiator assembly.

(d) w/ Air Cooled Transmission Oil Cooler:

(1) Slide the 2 clips and remove the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the radiator assembly and No.1 oil cooler tube sub-assembly.

11. REMOVE NO. 5 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

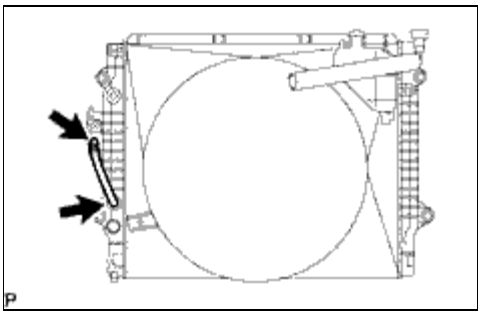
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

(a) Slide the clip and disconnect the No. 5 oil cooler outlet hose from the radiator assembly.

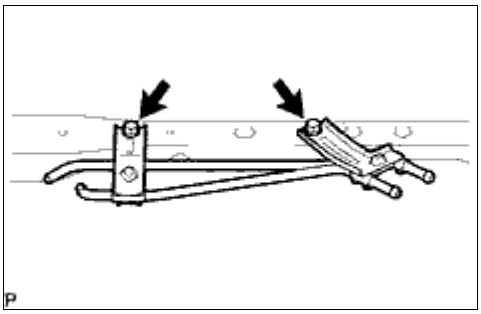


(b) Slide the clip and remove the No. 5 oil cooler outlet hose from the No.1 oil cooler tube sub-assembly.

12. REMOVE OIL COOLER TUBE

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(a) Remove the 2 bolts and oil cooler tube from the vehicle body.



13. REMOVE NO. 6 OIL COOLER INLET HOSE AND NO. 6 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

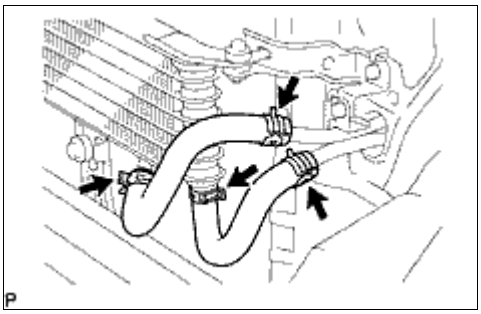
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

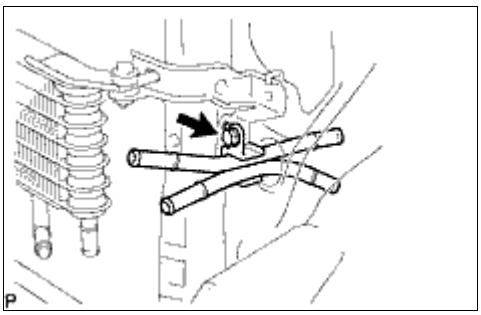
(a) Slide the 2 clips and disconnect the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose from the No.1 oil cooler tube sub-assembly.



(b) Slide the 2 clips and remove the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose from the oil cooler assembly.

14. REMOVE NO. 1 OIL COOLER TUBE SUB-ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

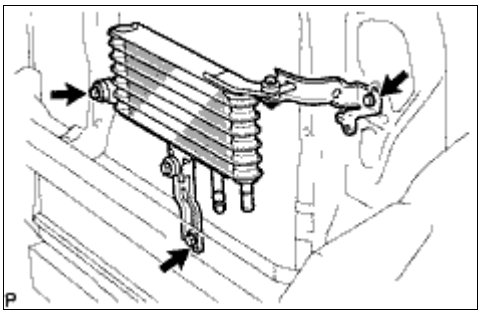
(a) Remove the bolt and No.1 oil cooler tube sub-assembly from the oil cooler bracket.



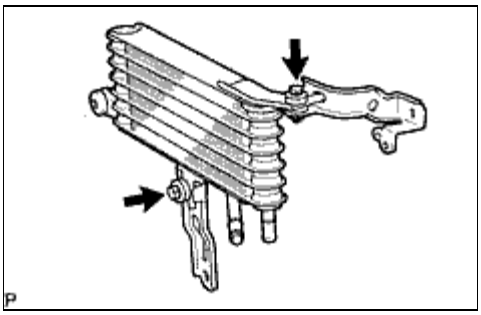
15. REMOVE OIL COOLER ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

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(a) Remove the 3 bolts and oil cooler assembly from the vehicle body.



(b) Remove the 2 bolts and 2 oil cooler brackets from the oil cooler assembly.

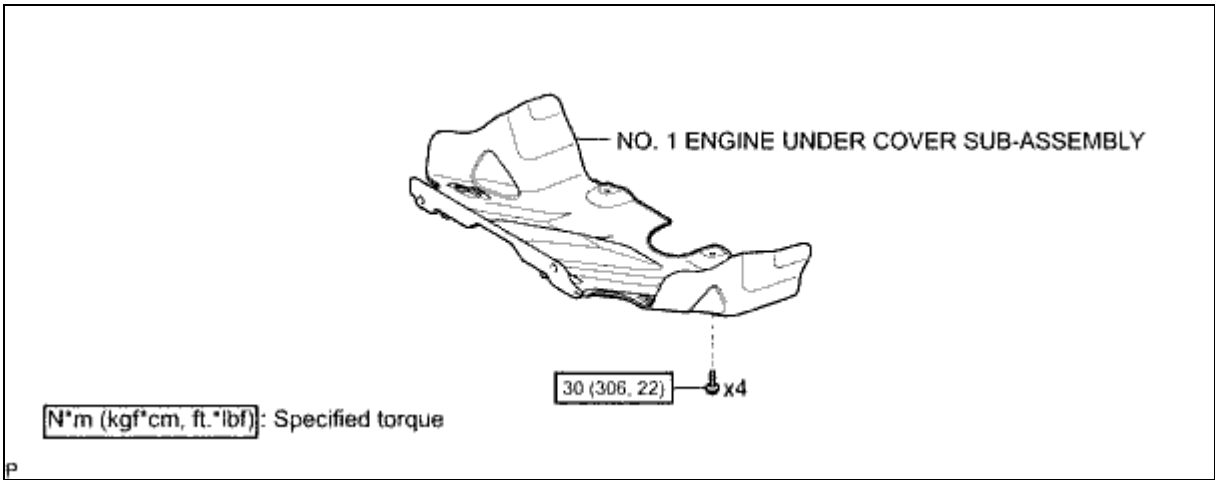


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM00000454X00GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL COOLER (for 2TR-FE): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

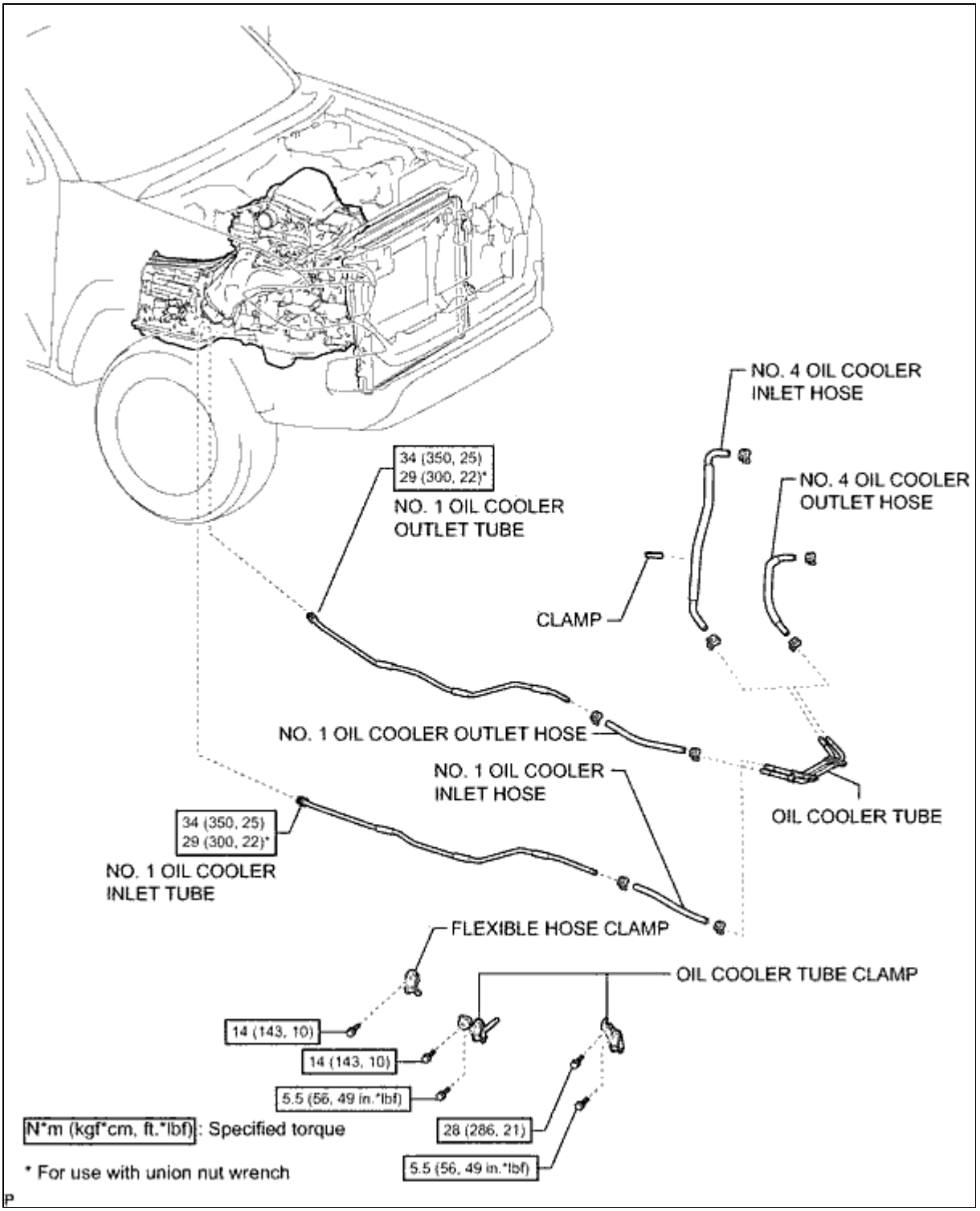
COMPONENTS

ILLUSTRATION



ILLUSTRATION

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000454W00GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL COOLER (for 2TR-FE): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL OIL COOLER TUBE

(a) Install the oil cooler tube to the vehicle body with the 2 bolts.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

2. INSTALL NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the radiator assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(c) Then pass the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose through the clamp and close the clamp.

3. INSTALL NO. 1 OIL COOLER INLET HOSE AND NO. 1 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

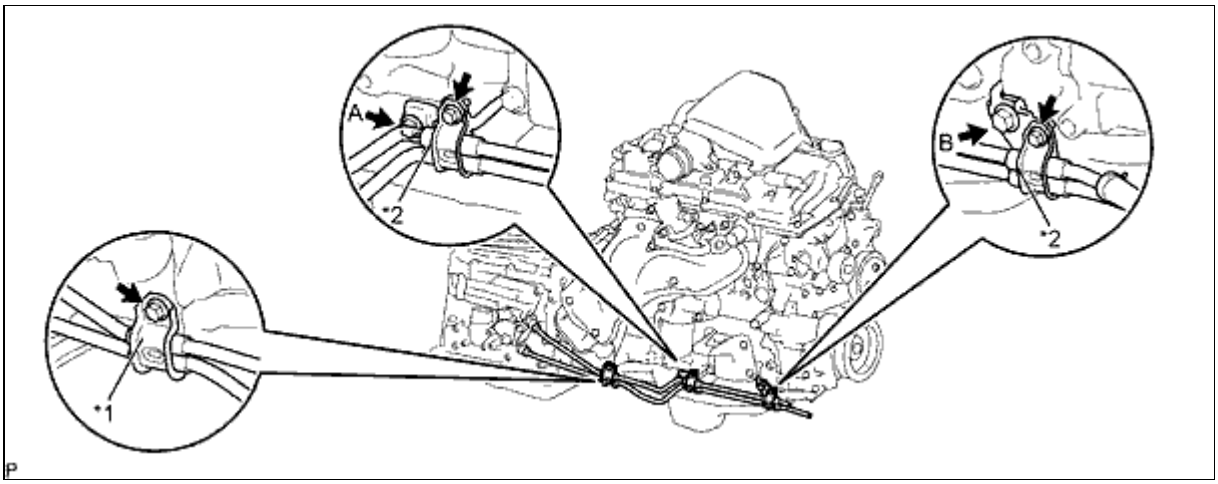
4. INSTALL NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

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(a) Install the 2 oil cooler tube clamps to the engine assembly with the 2 bolts.



Text in Illustration

*1	Flexible Hose Clamp	*2	Oil Cooler Tube Clamp

Torque:

for Bolt A -

14 N·m {143 kgf·cm, 10ft·lbf}

for Bolt B -

28 N·m {286 kgf·cm, 21ft·lbf}

(b) Connect the ends of the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube to the automatic transmission assembly by hand.

(c) Close the 2 oil cooler tube clamps and install the 2 bolts.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(d) Install the flexible hose clamp to the automatic transmission assembly with the bolt.

Torque:

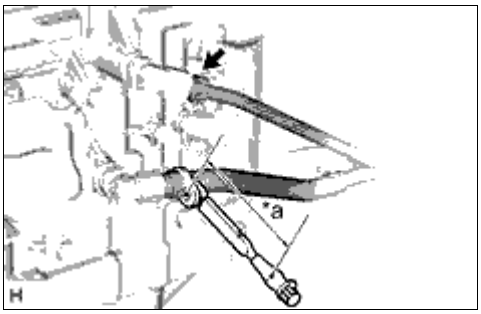
14 N·m {143 kgf·cm, 10ft·lbf}

(e) Connect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube, and slide the 2 clips to secure them.

(f) Using a 17 mm union nut wrench, tighten the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.

Text in Illustration

*a	Torque Wrench Fulcrum Length



Torque:

Specified tightening torque -

34 N·m {350 kgf·cm, 25ft·lbf}

HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using a union nut wrench (fulcrum length of 30 mm (1.18

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in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 29 N*m (300 kgf*cm, 22 ft.*lbf)

5. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

6. ADD AUTOMATIC TRANSMISSION FLUID

INFO

7. INSPECT FOR AUTOMATIC TRANSMISSION FLUID LEAK

8. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL COOLER (for 2TR-FE): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

2. REMOVE FRONT EXHAUST PIPE ASSEMBLY

INFO

3. REMOVE NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

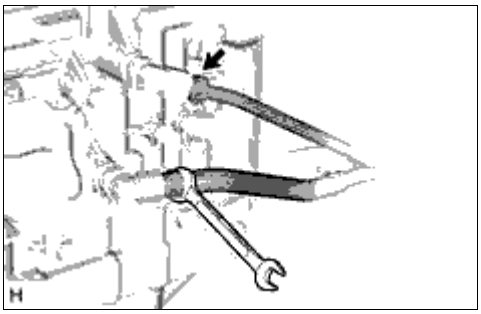
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

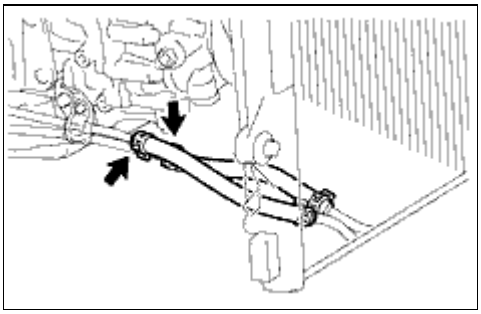
HINT:

Use a container to catch any ATF.

(a) Disconnect the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube from the automatic transmission assembly.

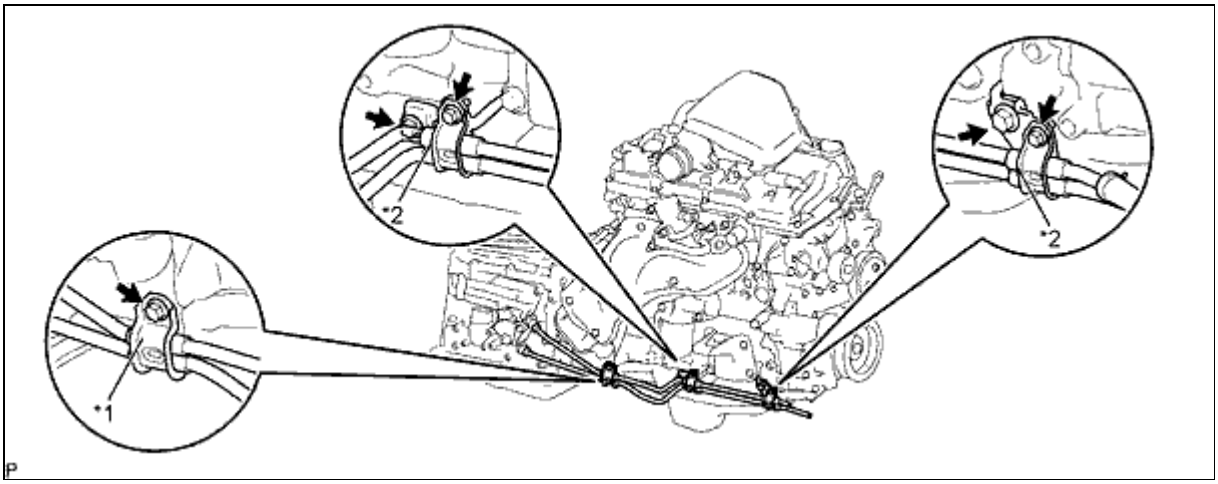


(b) Slide the 2 clips and disconnect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.



(c) Remove the bolt and flexible hose clamp from the automatic transmission assembly.

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Text in Illustration

*1	Flexible Hose Clamp	*2	Oil Cooler Tube Clamp

(d) Remove the 2 bolts to open the 2 oil cooler tube clamps and remove the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.

(e) Remove the 2 bolts and 2 oil cooler tube clamps from the engine assembly.

4. REMOVE NO. 1 OIL COOLER INLET HOSE AND NO. 1 OIL COOLER OUTLET HOSE

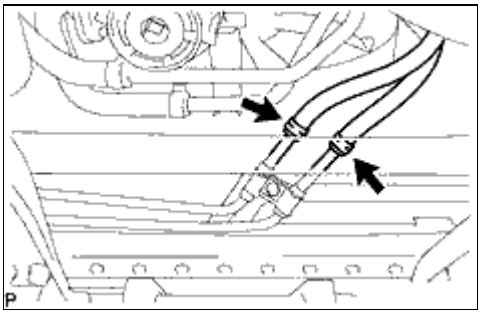
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

(a) Slide the 2 clips and remove the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the oil cooler tube.



5. REMOVE NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

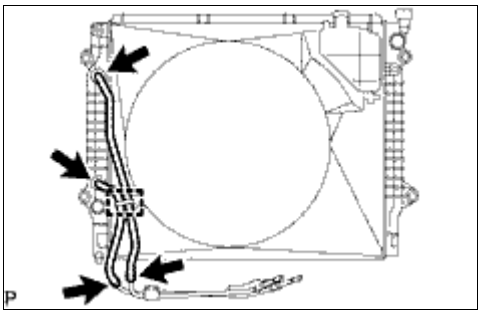
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

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(a) Detach the claw to open the clamp.

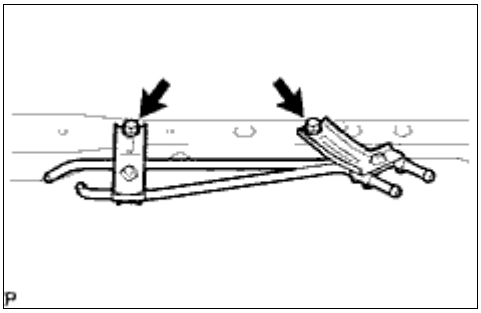


(b) Slide the 2 clips and disconnect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the oil cooler tube.

(c) Slide the 2 clips and remove the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the radiator assembly.

6. REMOVE OIL COOLER TUBE

(a) Remove the 2 bolts and oil cooler tube from the vehicle body.

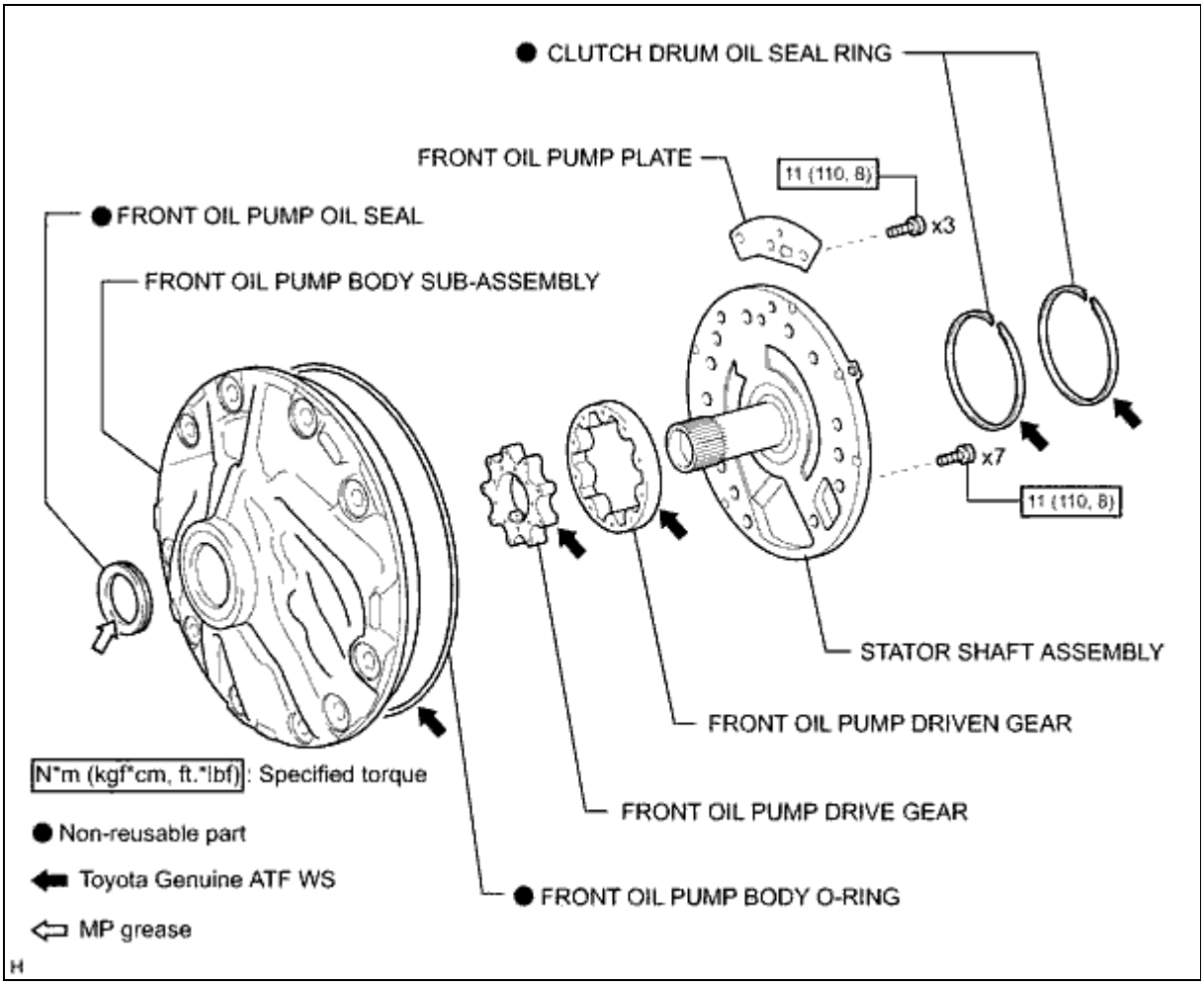


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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL PUMP: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



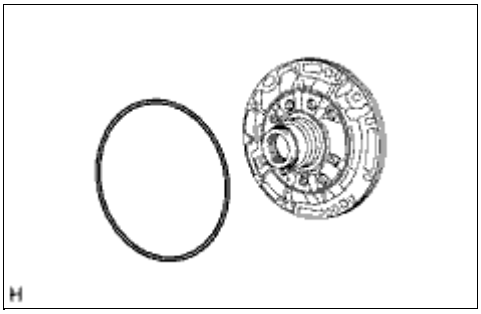
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA603KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL PUMP: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

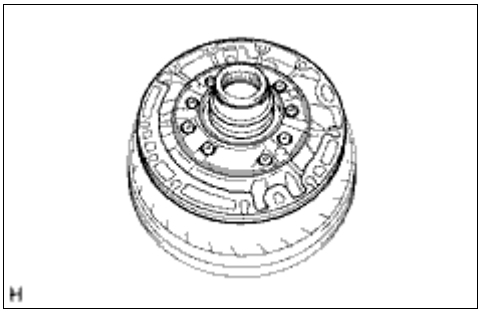
1. REMOVE FRONT OIL PUMP BODY O-RING

(a) Remove the front oil pump body O-ring from the oil pump assembly.



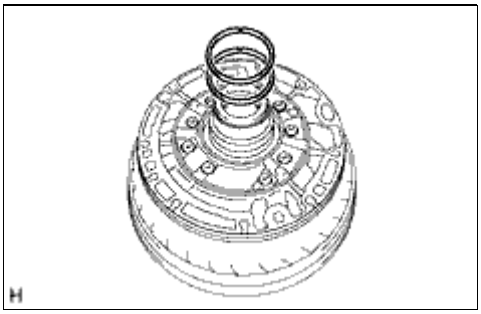
2. SECURE OIL PUMP ASSEMBLY

(a) Place the oil pump assembly on the torque converter assembly.



3. REMOVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 2 clutch drum oil seal rings from the oil pump assembly.

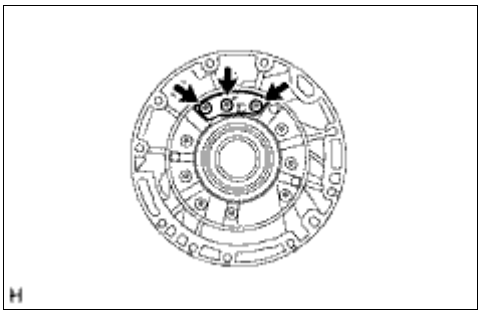


4. INSPECT FRONT OIL PUMP DRIVE GEAR ROTATION INFO

5. REMOVE FRONT OIL PUMP PLATE

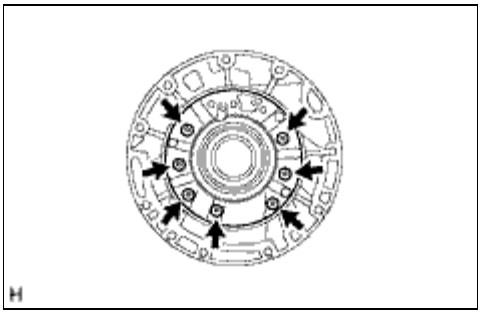
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(a) Using a T30 "TORX" socket wrench, remove the 3 screws and front oil pump plate from the oil pump assembly.



6. REMOVE STATOR SHAFT ASSEMBLY

(a) Using a T30 "TORX" socket wrench, remove the 7 screws and stator shaft assembly from the front oil pump body sub-assembly.

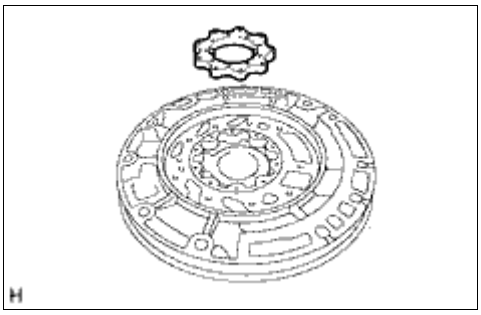


7. INSPECT STATOR SHAFT ASSEMBLY INFO

8. INSPECT CLEARANCE OF OIL PUMP ASSEMBLY INFO

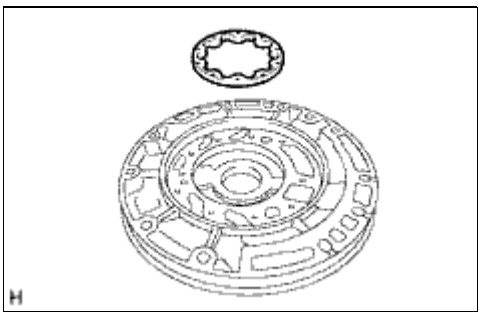
9. REMOVE FRONT OIL PUMP DRIVE GEAR

(a) Remove the front oil pump drive gear from the front oil pump body sub-assembly.



10. REMOVE FRONT OIL PUMP DRIVEN GEAR

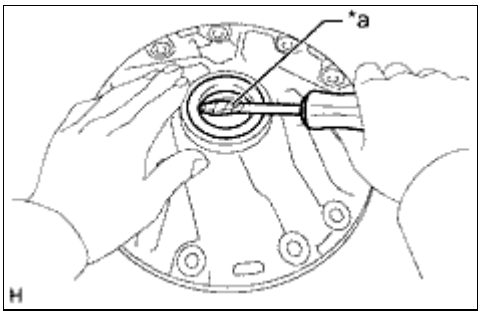
(a) Remove the front oil pump driven gear from the front oil pump body sub-assembly.



11. REMOVE FRONT OIL PUMP OIL SEAL

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(a) Using a screwdriver, remove the front oil pump oil seal from the front oil pump body sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Do not damage the bushing or front oil pump body sub-assembly.

HINT:

Tape the screwdriver tip before use.

12. INSPECT FRONT OIL PUMP BODY SUB-ASSEMBLY INFO

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000OA303KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL PUMP: INSPECTION; 2016 MY Tacoma [08/2015 -]		

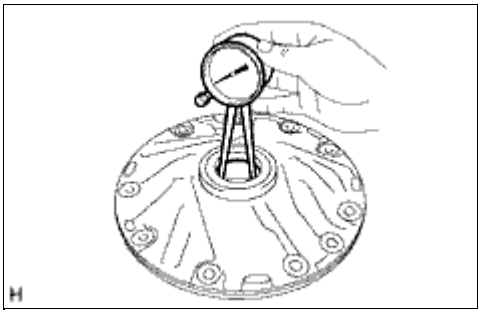
INSPECTION

1. INSPECT FRONT OIL PUMP BODY SUB-ASSEMBLY

(a) Using a dial indicator, measure the inside diameter of the front oil pump body sub-assembly bushing.

Maximum inside diameter:
38.138 mm (1.50 in.)

If the inside diameter is more than the maximum inside diameter, replace the front oil pump body sub-assembly.

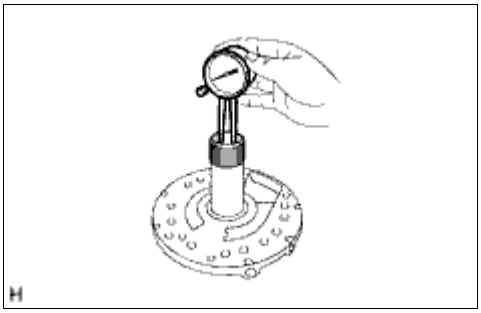


2. INSPECT STATOR SHAFT ASSEMBLY

(a) Using a dial indicator, measure the inside diameter of the stator shaft assembly bushing.

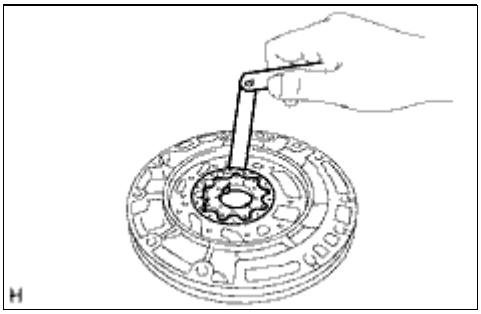
Maximum inside diameter:
22.227 mm (0.875 in.)

If the inside diameter is more than the maximum inside diameter, replace the stator shaft assembly.



3. INSPECT CLEARANCE OF OIL PUMP ASSEMBLY

(a) Push the front oil pump driven gear to one side of the front oil pump body sub-assembly.



(b) Using a feeler gauge, measure the clearance.

Standard body clearance:
0.10 to 0.17 mm (0.00394 to 0.00669 in.)

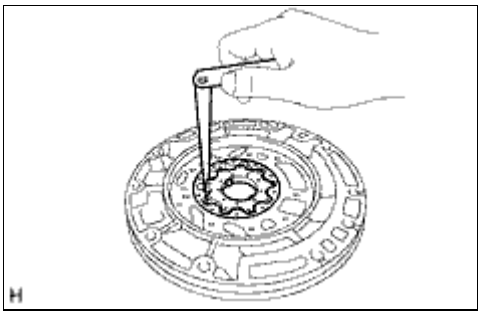
If the body clearance is more than the standard clearance, check the front oil pump drive gear, front oil pump driven gear and front oil pump body sub-assembly.

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(c) Using a feeler gauge, measure the clearance between the front oil pump driven gear teeth and the front oil pump drive gear teeth.

Standard tip clearance:
0.07 to 0.15 mm (0.00276 to 0.00590 in.)

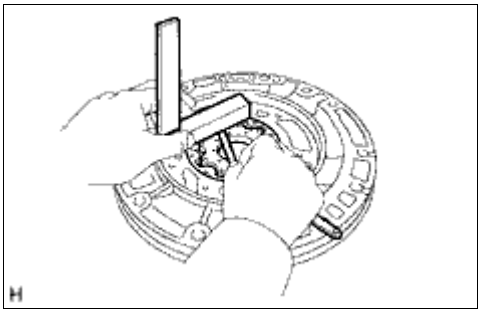
If the tip clearance is more than the standard clearance, check the front oil pump drive gear, front oil pump driven gear and front oil pump body sub-assembly.



(d) Using a steel straightedge and a feeler gauge, measure the side clearance of both gears.

Standard side clearance:
0.03 to 0.05 mm (0.00118 to 0.00196 in.)

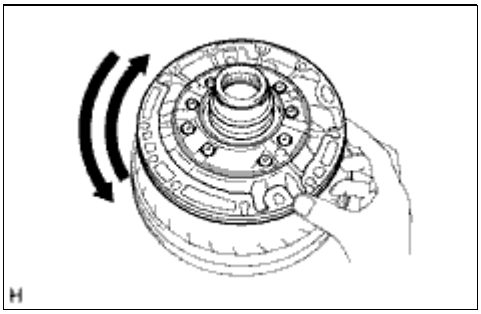
If the side clearance is more than the standard thickness, check the front oil pump drive gear, front oil pump driven gear and front oil pump body sub-assembly.



4. INSPECT OIL PUMP DRIVE GEAR ROTATION

(a) Install the oil pump assembly to the torque converter assembly.

(b) Check that the front oil pump drive gear rotates smoothly.



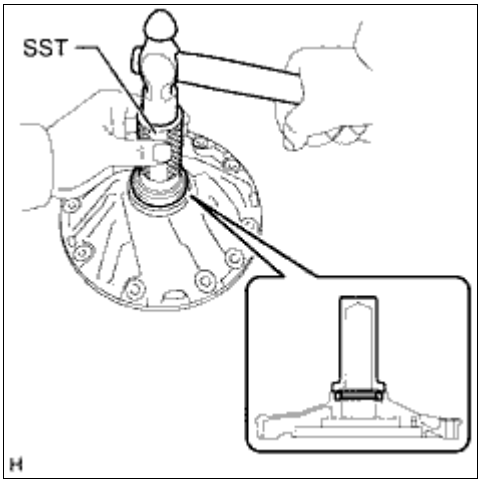
(c) Remove the oil pump assembly from the torque converter assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA703KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: OIL PUMP: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. INSTALL FRONT OIL PUMP OIL SEAL



(a) Using SST and a hammer, install a new front oil pump oil seal to the front oil pump body sub-assembly.

SST: 09350-30020

09351-32140

Standard depth:

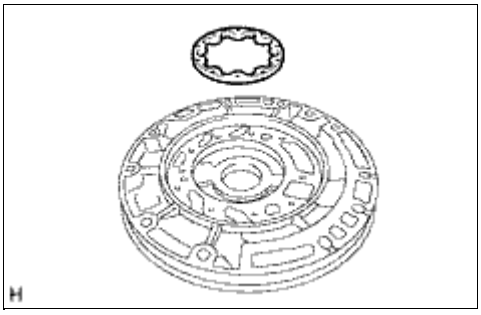
-0.3 to 0.3 mm (-0.0118 to 0.0118 in.)

(b) Coat the lip of the front oil pump oil seal with MP grease.

2. SECURE FRONT OIL PUMP BODY SUB-ASSEMBLY

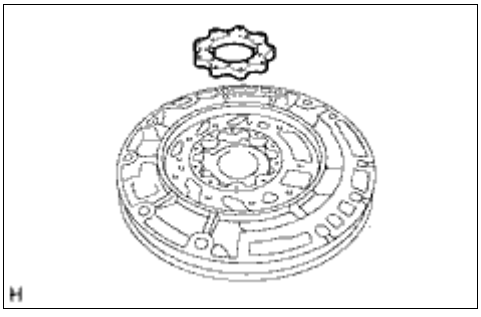
(a) Place the front oil pump body sub-assembly on the torque converter assembly.

3. INSTALL FRONT OIL PUMP DRIVEN GEAR



(a) Coat the front oil pump driven gear with ATF and install it to the front oil pump body sub-assembly.

4. INSTALL FRONT OIL PUMP DRIVE GEAR

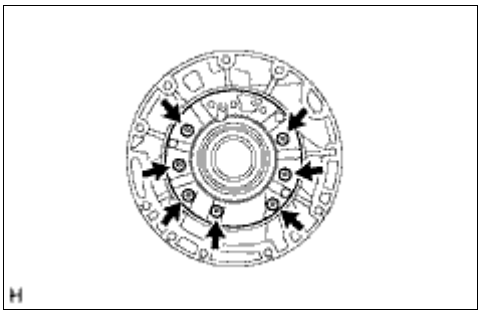


(a) Coat the front oil pump drive gear with ATF and install it to the front oil pump body sub-assembly.

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5. INSTALL STATOR SHAFT ASSEMBLY

(a) Align the bolt holes of the stator shaft assembly with the bolt holes of the front oil pump body sub-assembly and install the stator shaft assembly to the front oil pump body sub-assembly.



(b) Using a T30 "TORX" socket wrench, install the 7 screws.

Torque:

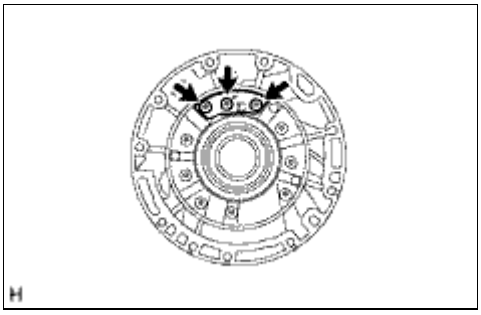
11 N·m {110 kgf·cm, 8ft·lbf}

6. INSTALL FRONT OIL PUMP PLATE

(a) Using a T30 "TORX" socket wrench, install the front oil pump plate with the 3 screws.

Torque:

11 N·m {110 kgf·cm, 8ft·lbf}



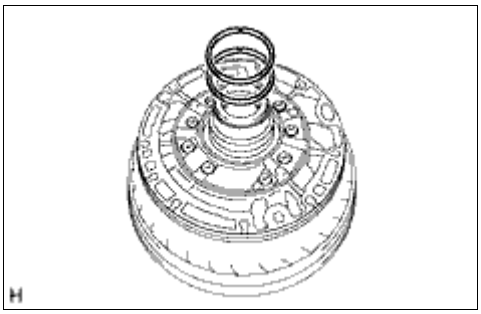
7. INSPECT OIL PUMP DRIVE GEAR ROTATION INFO

8. INSTALL CLUTCH DRUM OIL SEAL RING

(a) Coat 2 new clutch drum oil seal rings with ATF and install them to the oil pump assembly

NOTICE:

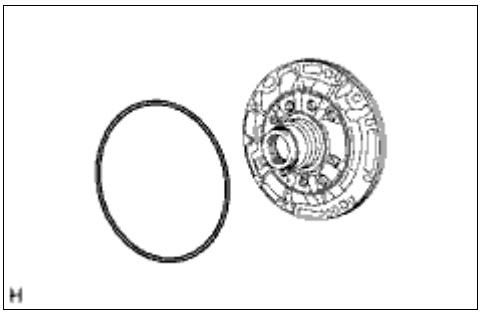
- Do not expand the gap of the clutch drum oil seal rings excessively.
- After installing the clutch drum oil seal rings, check that they rotate smoothly.



9. INSTALL FRONT OIL PUMP BODY O-RING

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(a) Coat a new front oil pump body O-ring with ATF and install it to the oil pump assembly.



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Last Modified: 11-13-2015	6.6 N	**Doc ID:** RM000000O5M01LX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: ADJUSTMENT; 2016 MY Tacoma [08/2015 -]		

ADJUSTMENT

1. ADJUST PARK/NEUTRAL POSITION SWITCH

(a) While pushing the shift lock release button, move the shift lever to N.

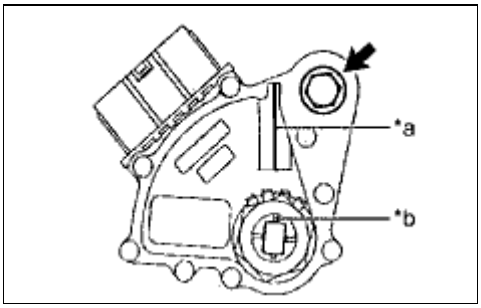
(b) Remove the bolt of the park/neutral position switch.

(c) Clean the bolt and bolt hole.

(d) Apply adhesive to 2 or 3 threads on the end of the bolt.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(e) Align the neutral basic line with the groove as shown in the illustration.



Text in Illustration

*a	Neutral Basic Line
*b	Groove

(f) Hold the park/neutral position switch in position and install the bolt.

Torque:
13 N·m {130 kgf·cm, 9ft·lbf}

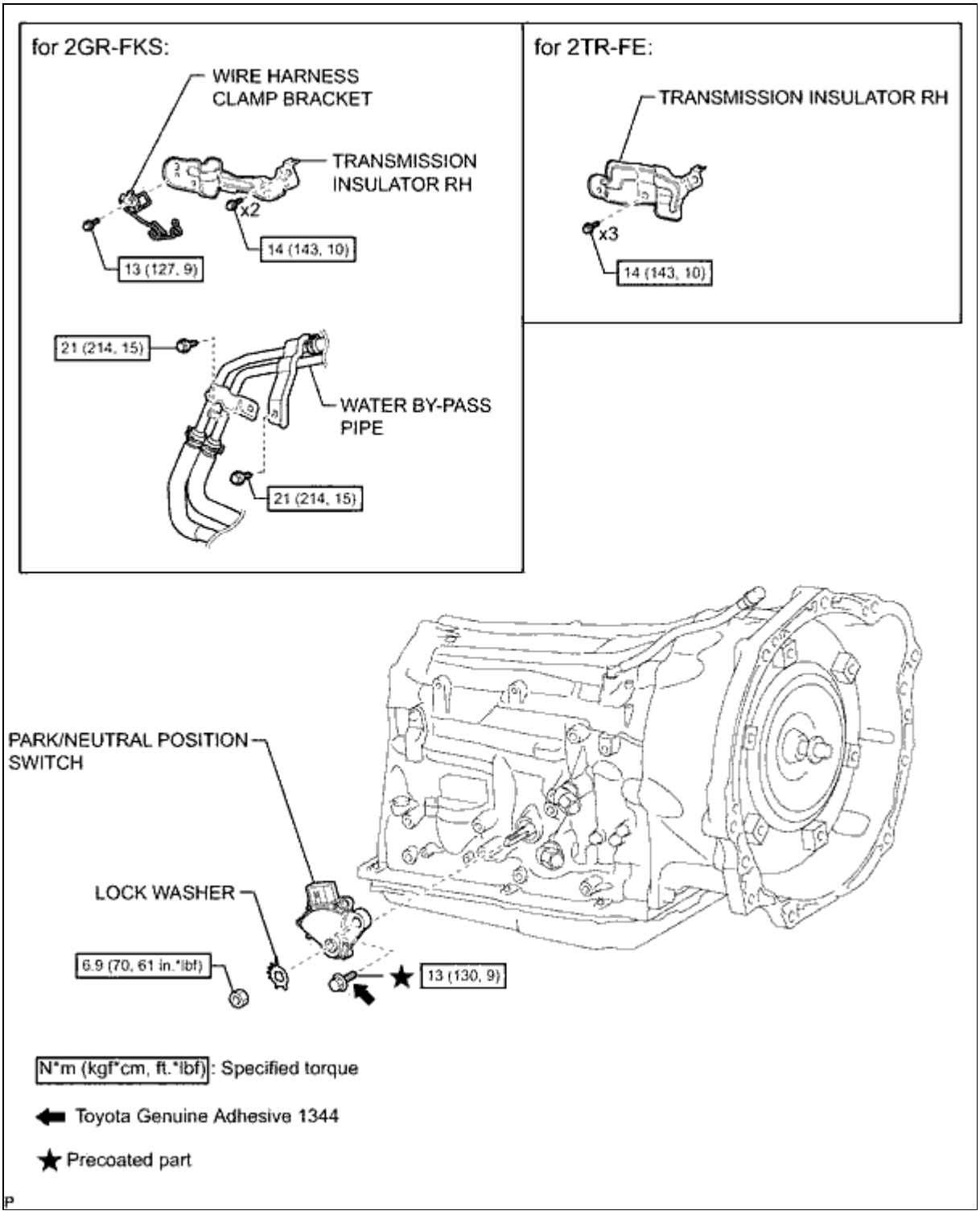
(g) After the adjustment, perform the park/neutral position switch operation check INFO .

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9R01EX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000OD401MX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT PARK/NEUTRAL POSITION SWITCH

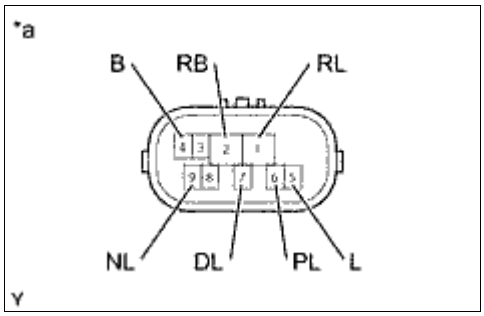
(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Park/Neutral Position Switch)

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (B) - 5 (L)	Shift lever in P or N	Below 1 Ω
2 (RB) - 6 (PL)	Shift lever in P	Below 1 Ω
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
2 (RB) - 9 (NL)	Shift lever in N	Below 1 Ω
2 (RB) - 7 (DL)	Shift lever in D, S, "+" or "-"	Below 1 Ω
4 (B) - 5 (L)	Shift lever not in P or N	10 kΩ or higher
2 (RB) - 6 (PL)	Shift lever not in P	10 kΩ or higher
2 (RB) - 1 (RL)	Shift lever not in R	10 kΩ or higher
2 (RB) - 9 (NL)	Shift lever not in N	10 kΩ or higher
2 (RB) - 7 (DL)	Shift lever not in D, S, "+" or "-"	10 kΩ or higher



If the resistance value is not as specified, replace the park/neutral position switch.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O5N01TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL PARK/NEUTRAL POSITION SWITCH

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

(a) Clean the bolt and bolt hole.

(b) Apply adhesive to 2 or 3 threads on the end of the bolt.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(c) Temporarily install the park/neutral position switch to the automatic transmission assembly with the bolt.

HINT:

Tighten the bolt to the specified torque when adjusting the park/neutral position switch.

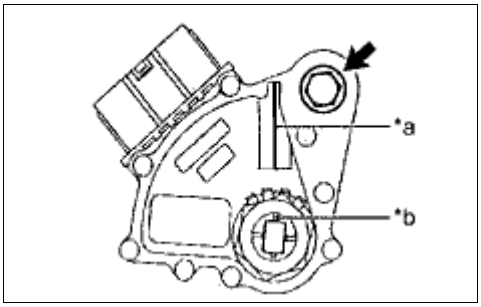
(d) Install a new lock washer and nut to the park/neutral position switch.

Torque:

6.9 N·m {70 kgf·cm, 61in·lbf}

(e) Move the shift lever to N.

(f) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.



Text in Illustration

*a	Neutral Basic Line
*b	Groove

Torque:

13 N·m {130 kgf·cm, 9ft·lbf}

(g) Using a screwdriver, bend the tabs of the lock washer.

NOTICE:

- Be careful not to damage the park/neutral position switch.
- Bend at least 2 of the lock washer tabs.

HINT:

Tape the screwdriver tip before use.

(h) Connect the park/neutral position switch connector.

2. INSTALL WATER BY-PASS PIPE (for 2GR-FKS)

(a) Install the water by-pass pipe to the automatic transmission assembly with the 2 bolts.

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Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

3. INSTALL TRANSMISSION INSULATOR RH (for 2GR-FKS) INFO

4. INSTALL TRANSMISSION INSULATOR RH (for 2TR-FE) INFO

5. INSPECT PARK/NEUTRAL POSITION SWITCH INFO

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000OD501NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: ON-VEHICLE INSPECTION; 2016 MY Tacoma [08/2015 -]		

ON-VEHICLE INSPECTION

1. INSPECT PARK/NEUTRAL POSITION SWITCH

(a) Apply the parking brake.

(b) Turn the ignition switch to ON.

(c) Depress the brake pedal and move the shift lever to any position other than P.

(d) Depress the brake pedal and check that the engine starts when the shift lever is in N or P, but does not start in other positions.

(e) Check that the back-up light comes on and the reverse warning buzzer sounds when the shift lever is in R, but the light and buzzer do not operate in other positions.

If a failure is found, check the park/neutral position switch for continuity.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O5O01RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: REMOVAL; 2016 MY Tacoma [08/2015 -]		

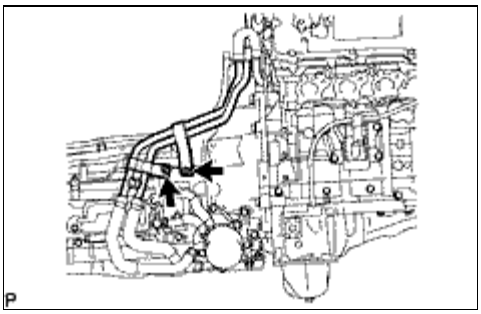
REMOVAL

1. REMOVE TRANSMISSION INSULATOR RH (for 2GR-FKS) INFO

2. REMOVE TRANSMISSION INSULATOR RH (for 2TR-FE) INFO

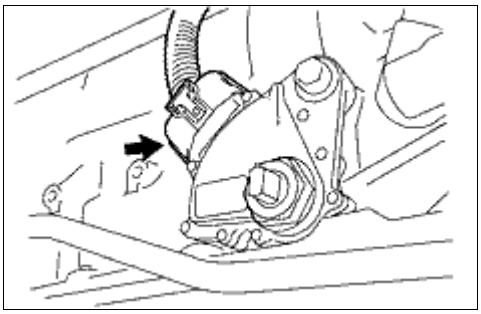
3. SEPARATE WATER BY-PASS PIPE (for 2GR-FKS)

(a) Remove the 2 bolts to separate the water by-pass pipe from the automatic transmission assembly.

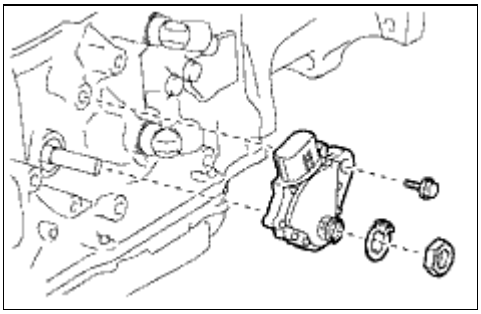


4. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Disconnect the park/neutral position switch connector.



(b) Using a screwdriver, pry out the lock washer.



(c) Remove the nut and lock washer.

(d) Remove the bolt and park/neutral position switch from the automatic transmission assembly.

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

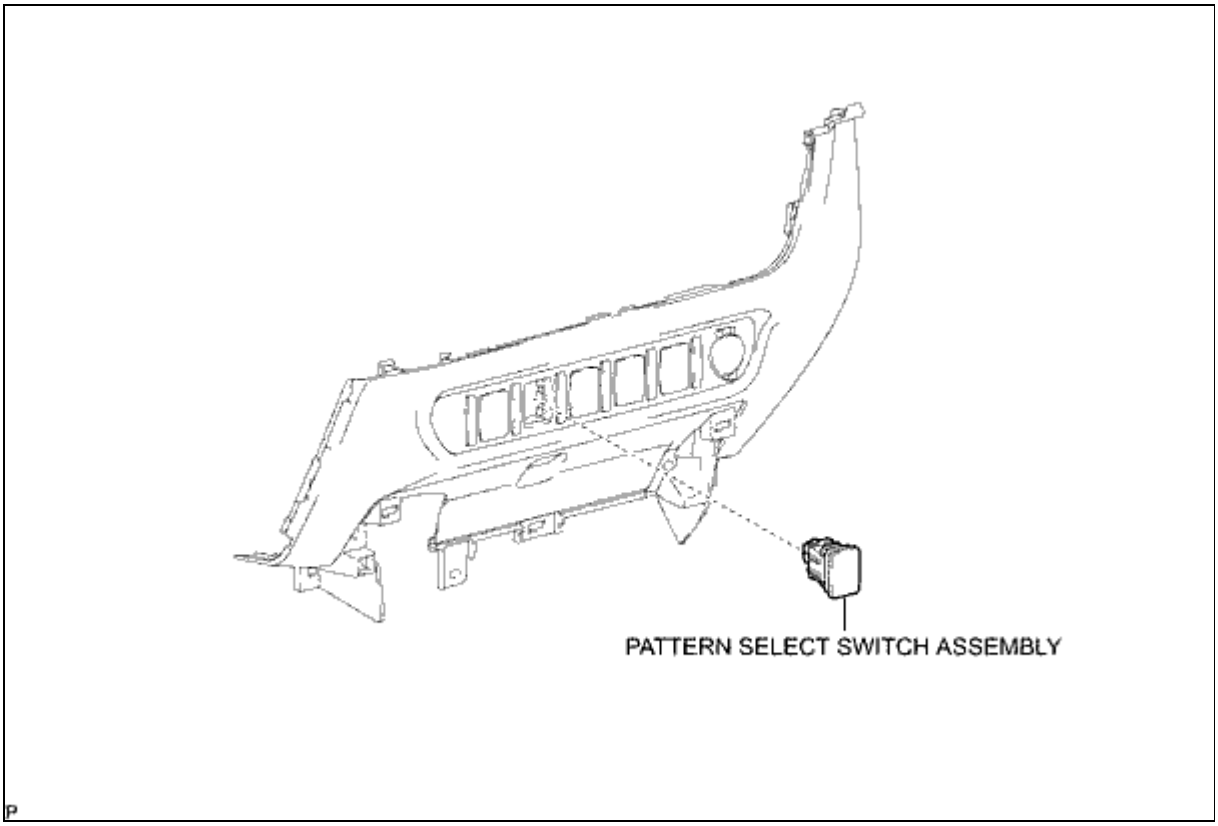
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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005VOV000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000005VOU000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: INSPECTION; 2016 MY Tacoma [08/2015 -]		

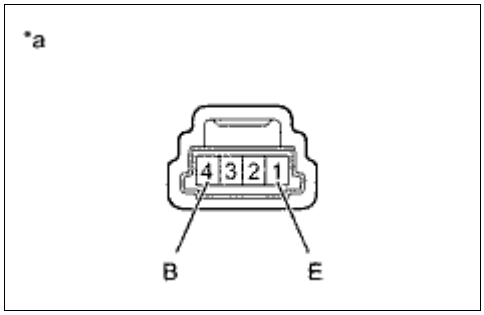
INSPECTION

1. INSPECT PATTERN SELECT SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Pattern Select Switch Assembly)



Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
4 (B) - 1 (E)	Pattern select switch pushed	Below 1 Ω
	Pattern select switch not pushed	10 kΩ or higher

If the result is not as specified, replace the pattern select switch assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000005VOT000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL PATTERN SELECT SWITCH ASSEMBLY

(a) Attach the 2 claws to install the pattern select switch assembly to the instrument panel lower center finish panel.

2. INSTALL INSTRUMENT PANEL LOWER CENTER FINISH PANEL

INFO

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000005VOW000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: REMOVAL; 2016 MY Tacoma [08/2015 -]		

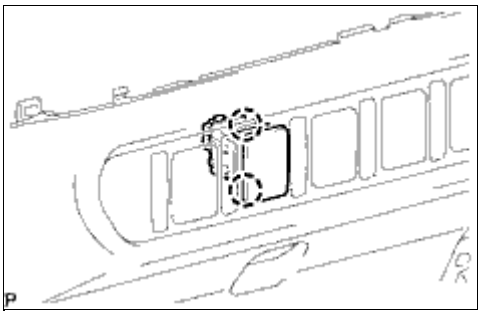
REMOVAL

1. REMOVE INSTRUMENT PANEL LOWER CENTER FINISH PANEL

INFO

2. REMOVE PATTERN SELECT SWITCH ASSEMBLY

(a) Detach the 2 claws to remove the pattern select switch assembly from the instrument panel lower center finish panel.

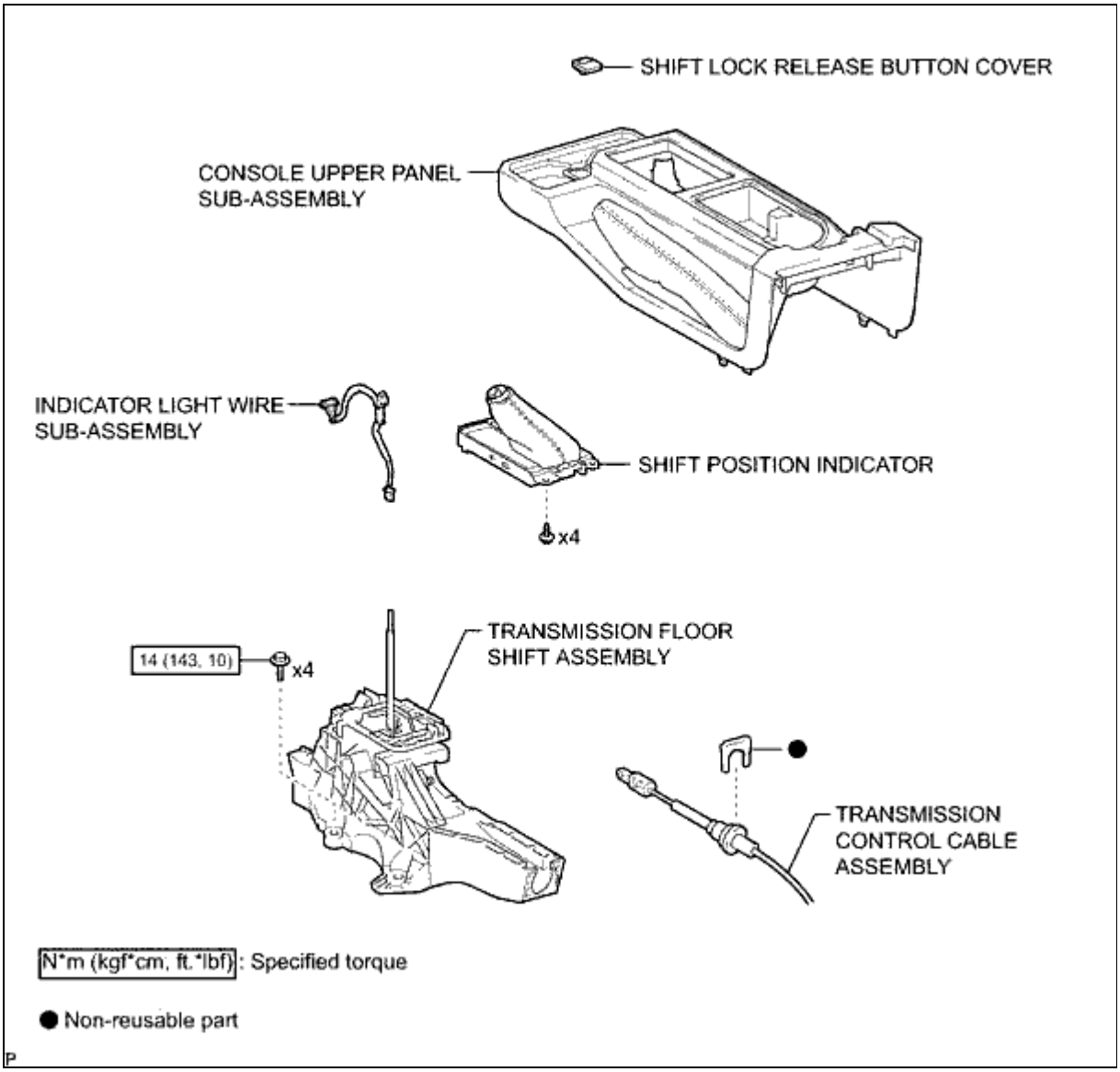


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005NPA006X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SHIFT LEVER: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



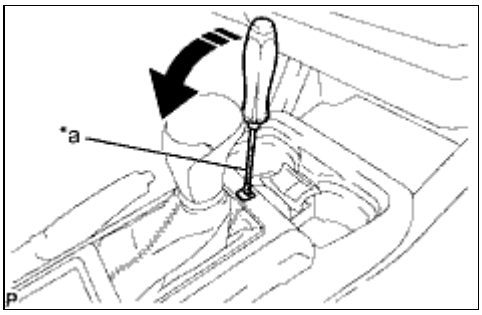
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NR03GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SHIFT LEVER: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. REMOVE SHIFT LOCK RELEASE BUTTON COVER

(a) Using a screwdriver with its tip wrapped in protective tape, detach the 2 claws to remove the shift lock release button cover from the console upper panel sub-assembly.

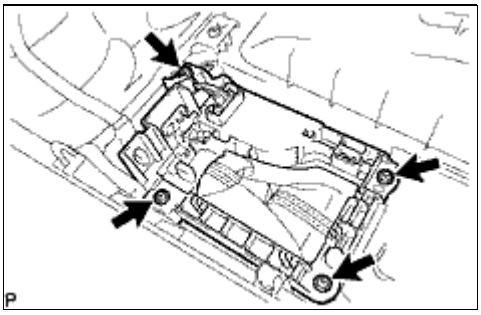


Text in Illustration

*a	Protective Tape
➡	Remove in this Direction

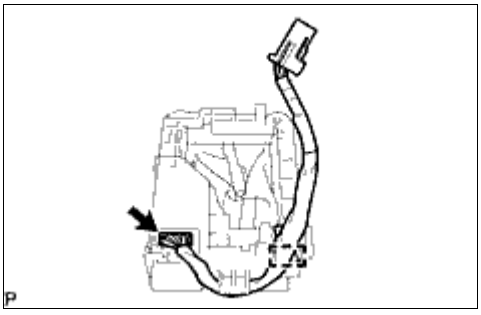
2. REMOVE SHIFT POSITION INDICATOR

(a) Remove the 4 screws and shift position indicator from the console upper panel sub-assembly.



3. REMOVE INDICATOR LIGHT WIRE SUB-ASSEMBLY

(a) Detach the clamp to separate the indicator light wire sub-assembly from the shift position indicator.



(b) Disconnect the connector to remove the indicator light wire sub-assembly from the shift position indicator.

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000004S3800XX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SHIFT LEVER: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TRANSMISSION FLOOR SHIFT ASSEMBLY (w/o Smart Key System)

HINT:

If the results of the following inspections are as specified but a malfunction has occurred, replace the transmission floor shift assembly.

(a) Inspect the wire harness.

(1) Disconnect the shift lock control ECU connector.

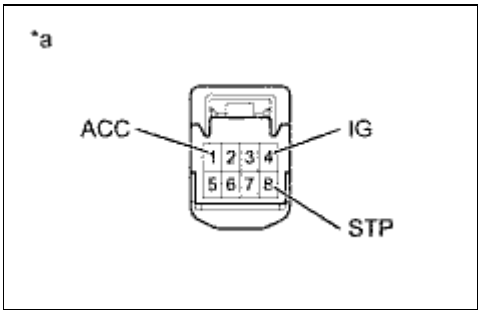
(2) Measure the voltage according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (ACC) - Body ground	Ignition switch ACC	11 to 14 V
	Ignition switch off	Below 1 V
4 (IG) - Body ground	Ignition switch ON	11 to 14 V
	Ignition switch off	Below 1 V
8 (STP) - Body ground	Brake pedal depressed	11 to 14 V
	Brake pedal released	Below 1 V



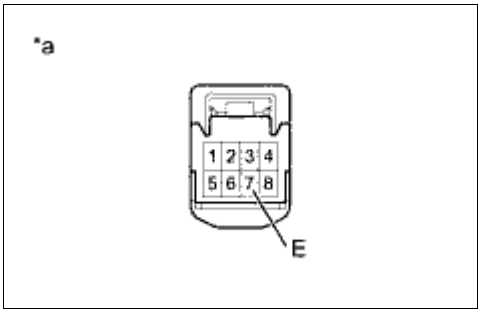
If the result is not as specified, repair or replace the wire harness or connector.

(3) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))

Standard Resistance:



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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
7 (E) - Body ground	Always	Below 1 Ω

If the result is not as specified, repair or replace the wire harness or connector.

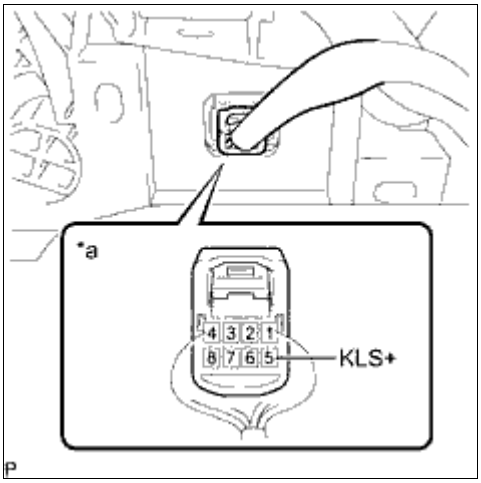
(b) Inspect the key interlock solenoid operation signal.

(1) Connect the shift lock control ECU connector.

(2) Measure the voltage according to the value(s) in the table below.

Text in Illustration

*a	Component with harness connected (Shift Lock Control ECU (Transmission Floor Shift Assembly))



Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (KLS+) - Body ground	Ignition switch ACC and shift lever in P	Below 1 V
	Ignition switch ACC and shift lever not in P	11 to 14 V

HINT:

Do not disconnect the shift lock control ECU connector.

If the result is not as specified, replace the transmission floor shift assembly.

If the shift lock does not operate when the power source of the shift lock control ECU is normal and the resistance between the body ground and the shift lock control ECU is as specified, replace the transmission floor shift assembly.

2. INSPECT TRANSMISSION FLOOR SHIFT ASSEMBLY (w/ Smart Key System)

HINT:

If the results of the following inspections are as specified but a malfunction has occurred, replace the transmission floor shift assembly.

(a) Inspect the wire harness.

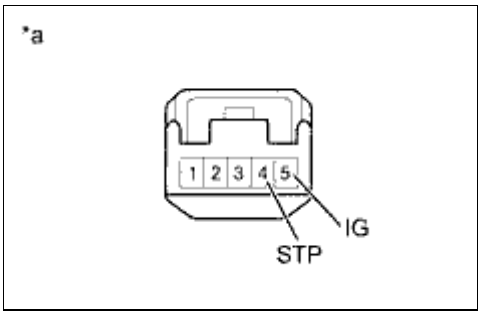
(1) Disconnect the shift lock control ECU connector.

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(2) Measure the voltage according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))



Standard Voltage:

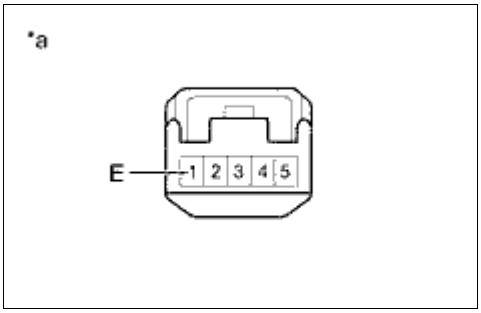
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (IG) - Body ground	Engine switch on (IG)	11 to 14 V
	Engine switch off	Below 1 V
4 (STP) - Body ground	Brake pedal depressed	11 to 14 V
	Brake pedal released	Below 1 V

If the result is not as specified, repair or replace the wire harness or connector.

(3) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))



Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (E) - Body ground	Always	Below 1 Ω

If the result is not as specified, repair or replace the wire harness or connector.

If the shift lock does not operate when the power source of the shift lock control ECU is normal and the resistance between the body ground and the shift lock control ECU is as specified, replace the transmission floor shift assembly.

3. INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)

(a) Disconnect the transmission control switch connector.

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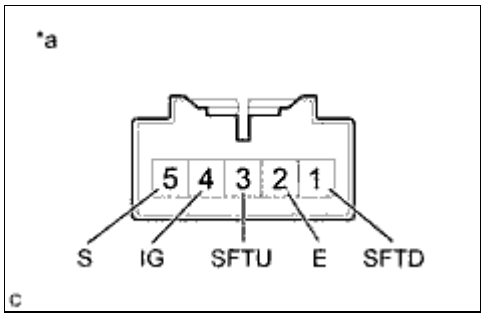
(b) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "- "	Below 1 Ω
	Shift lever not in S, "+" or "- "	10 kΩ or higher
3 (SFTU) - 2 (E)	Shift lever held in "+" (Up-shift)	Below 1 Ω
	Shift lever not held in "+"	10 kΩ or higher
1 (SFTD) - 2 (E)	Shift lever held in "- " (Down-shift)	Below 1 Ω
	Shift lever not held in "-"	10 kΩ or higher



If the result is not as specified, replace the transmission floor shift assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NO04CX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SHIFT LEVER: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION FLOOR SHIFT ASSEMBLY

(a) Install the transmission floor shift assembly to the vehicle body with the 4 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Attach the 4 clamps to connect the wire harness to the transmission floor shift assembly.

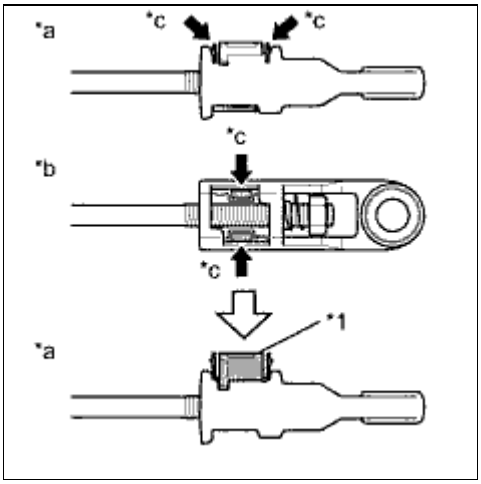
(c) Connect the 2 connectors to the transmission floor shift assembly.

2. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

NOTICE:

Check that the park/neutral position switch and the shift lever are in N.

(a) Push the 2 claws together at the top of the transmission control cable lock piece. While holding the 2 claws together, push the 2 lugs on the bottom of the lock piece toward each other and upward to pull out the lock piece.

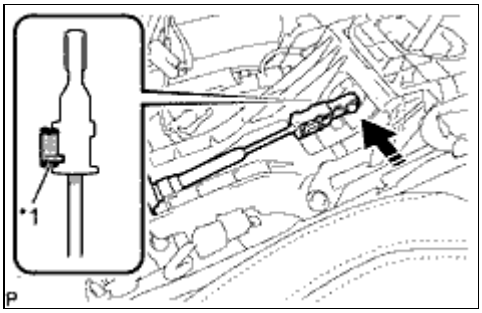


Text in Illustration

*1	Lock Piece
*a	Side View
*b	Bottom View
*c	Push

(b) Connect the transmission control cable assembly to the transmission floor shift assembly, and install a new clip.

(c) Connect the end of the transmission control cable assembly to the transmission floor shift assembly.



Text in Illustration

*1	Lock Piece

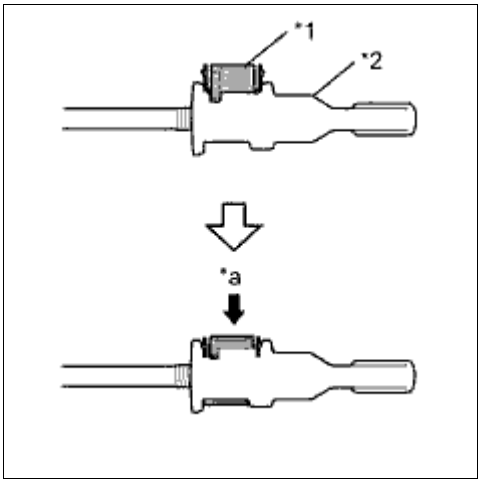
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➡	Connect in this Direction

NOTICE:

- The shift lever should be in N.
- Make sure that the lock piece is pulled up.
- Push on the end of the cable all the way to the base of the transmission floor shift assembly pin.

(d) Push the lock piece into the adjuster case.



Text in Illustration

*1	Lock Piece
*2	Adjuster Case
*a	Push

NOTICE:

Securely push in the lock piece until it locks.

3. INSPECT SHIFT LEVER POSITION INFO

4. INSTALL FRONT CONSOLE BOX

INFO

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000002M9A08TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SHIFT LEVER: ON-VEHICLE INSPECTION; 2016 MY Tacoma [08/2015 -]		

ON-VEHICLE INSPECTION

1. INSPECT SHIFT LEVER POSITION

(a) When moving the shift lever from P to each position with the ignition switch ON and the brake pedal depressed, check that the shift lever moves smoothly and correctly into position.

(b) Start the engine and check that the vehicle moves forward when the shift lever is moved from N to D and moves rearward when the shift lever is moved to R.

If the operation is not as specified, inspect the park/neutral position switch and transmission floor shift assembly.

2. INSPECT SHIFT LOCK OPERATION

(a) Move the shift lever to P.

(b) Turn the ignition switch off.

(c) Check that the shift lever cannot be moved from P to any other position.

(d) Turn the ignition switch to ON, depress the brake pedal, and check that the shift lever can be moved to other position.

If the operation is not as specified, inspect the transmission floor shift assembly.

3. INSPECT SHIFT LOCK RELEASE BUTTON OPERATION

(a) Move the shift lever to P.

(b) Turn the ignition switch off.

(c) Remove the shift lock release button cover.

(d) When moving the shift lever with the shift lock release button pressed, check that the shift lever can be moved from P to any other position.

If the operation is not as specified, inspect the transmission floor shift assembly.

(e) Install the shift lock release button cover.

4. INSPECT KEY INTERLOCK OPERATION (w/o Smart Key System)

(a) Turn the ignition switch to ON.

(b) Depress the brake pedal and move the shift lever to any position other than P.

(c) Check that the ignition key cannot be turned to LOCK.

(d) Move the shift lever to P, turn the ignition key to LOCK and check that the ignition key can be removed.

If the operation is not as specified, inspect the transmission floor shift assembly.

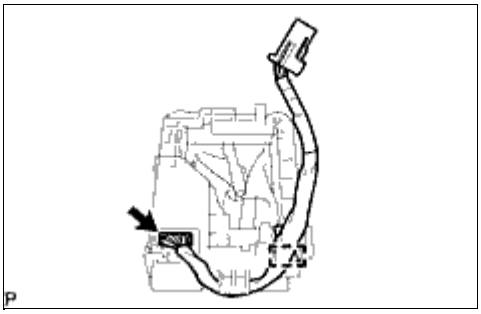
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NS03GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SHIFT LEVER: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. INSTALL INDICATOR LIGHT WIRE SUB-ASSEMBLY

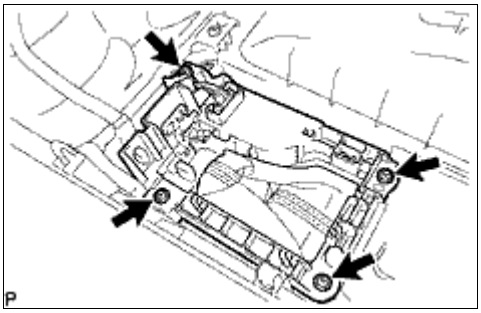
(a) Connect the connector to install the indicator light wire sub-assembly to the shift position indicator.



(b) Attach the clamp to install the indicator light wire sub-assembly to the shift position indicator.

2. INSTALL SHIFT POSITION INDICATOR

(a) Install the shift position indicator to the console upper panel sub-assembly with the 4 screws.



3. INSTALL SHIFT LOCK RELEASE BUTTON COVER

(a) Attach the 2 claws to install the shift lock release button cover to the console upper panel sub-assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NQ03AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SHIFT LEVER: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

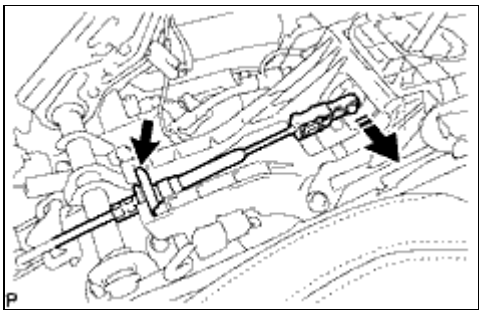
1. REMOVE FRONT CONSOLE BOX

INFO

2. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Move the shift lever to N.

(b) Disconnect the end of the transmission control cable assembly from the transmission floor shift assembly.



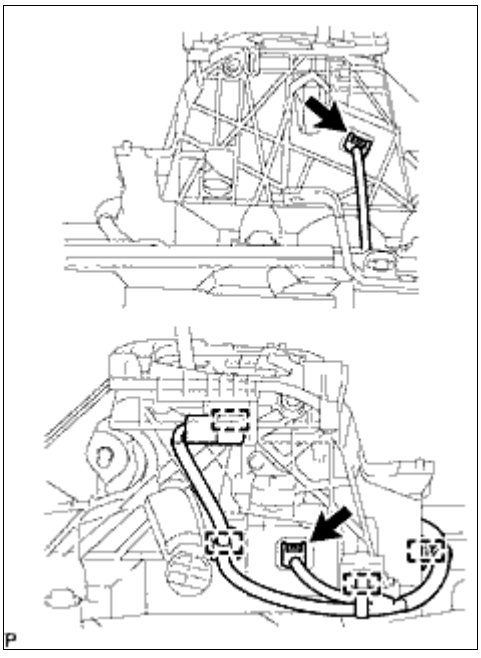
Text in Illustration

➡	Disconnect in this Direction

(c) Remove the clip to disconnect the transmission control cable assembly from the transmission floor shift assembly.

3. REMOVE TRANSMISSION FLOOR SHIFT ASSEMBLY

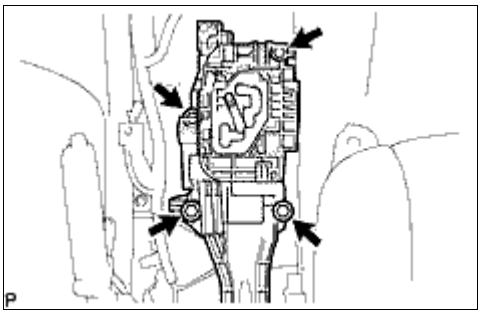
(a) Disconnect the 2 connectors from the transmission floor shift assembly.



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(b) Detach the 4 clamps to disconnect the wire harness from the transmission floor shift assembly.

(c) Remove the 4 bolts and transmission floor shift assembly from the vehicle body.

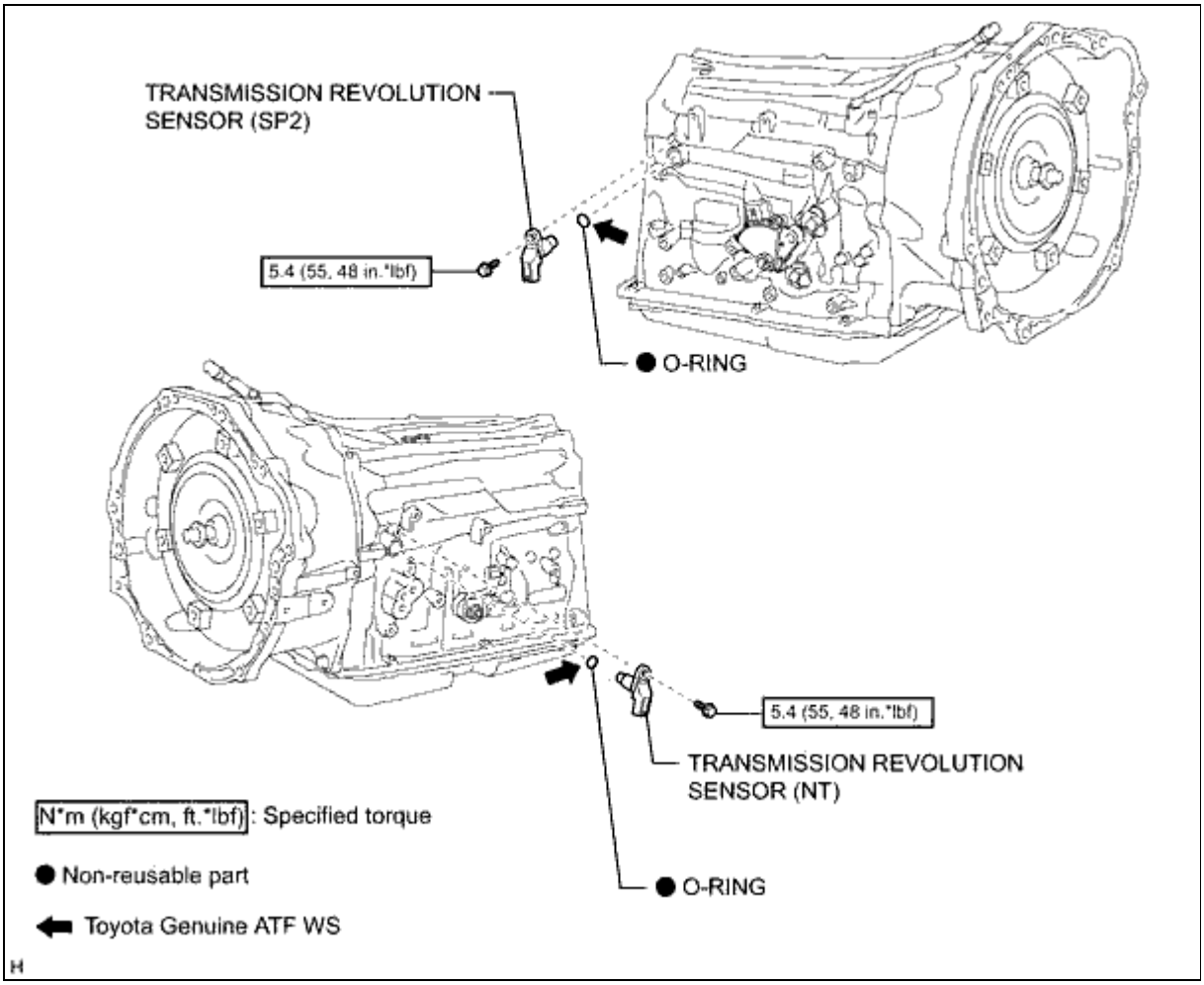


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9T04CX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SPEED SENSOR: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



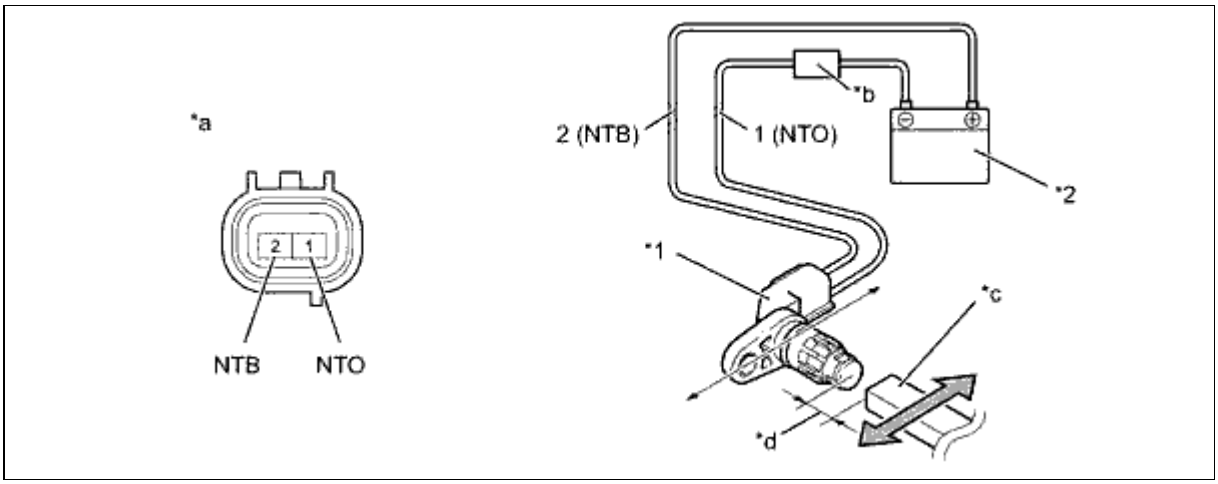
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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000UKF04ZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SPEED SENSOR: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TRANSMISSION REVOLUTION SENSOR (NT)

(a) Connect the battery to the transmission revolution sensor (NT) as shown in the illustration.



Text in Illustration

*1	Transmission Revolution Sensor (NT)	*2	Battery
*a	Component without harness connected (Transmission Revolution Sensor (NT))	*b	Ammeter
*c	Magnet	*d	5 mm (0.197 in.) or less

(b) Wave a magnetic object left and right in front of the transmission revolution sensor (NT) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(c) Measure the current according to the value(s) in the table below.

Standard Current:

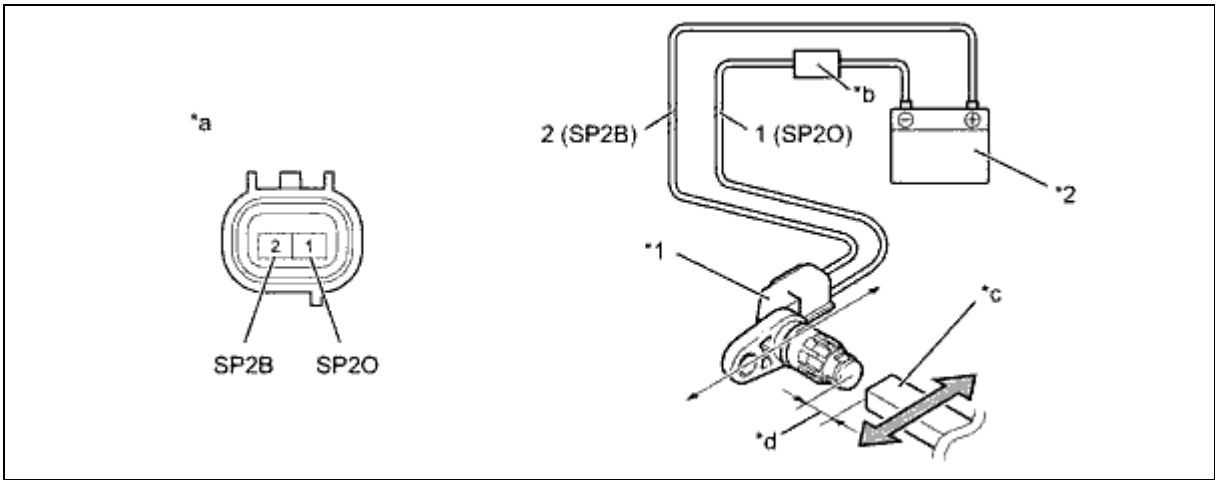
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (NTO) - 2 (NTB)	Low signal	4 to 8 mA
	High signal	12 to 16 mA

If the result is not as specified, replace the transmission revolution sensor (NT).

2. INSPECT TRANSMISSION REVOLUTION SENSOR (SP2)

(a) Connect the battery to the transmission revolution sensor (SP2) as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (SP2)	*2	Battery
*a	Component without harness connected (Transmission Revolution Sensor (SP2))	*b	Ammeter
*c	Magnet	*d	5 mm (0.197 in.) or less

(b) Wave a magnetic object left and right in front of the transmission revolution sensor (SP2) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(c) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SP2O) - 2 (SP2B)	Low signal	4 to 8 mA
	High signal	12 to 16 mA

If the result is not as specified, replace the transmission revolution sensor (SP2).

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OE206WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SPEED SENSOR: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION REVOLUTION SENSOR (SP2)

(a) Coat a new O-ring with ATF and install it to the transmission revolution sensor (SP2).

(b) Install the transmission revolution sensor (SP2) with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

(c) Connect the transmission revolution sensor (SP2) connector.

2. INSTALL TRANSMISSION REVOLUTION SENSOR (NT)

(a) Coat a new O-ring with ATF and install it to the transmission revolution sensor (NT).

(b) Install the transmission revolution sensor (NT) with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

(c) Connect the transmission revolution sensor (NT) connector.

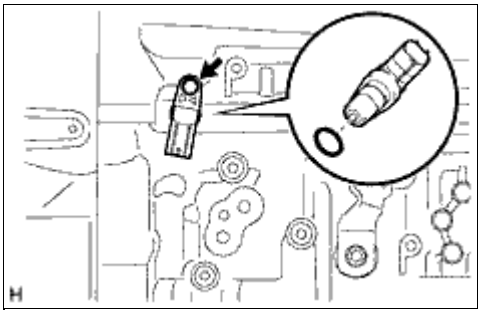
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OE406TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: SPEED SENSOR: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. REMOVE TRANSMISSION REVOLUTION SENSOR (NT)

(a) Disconnect the transmission revolution sensor (NT) connector.

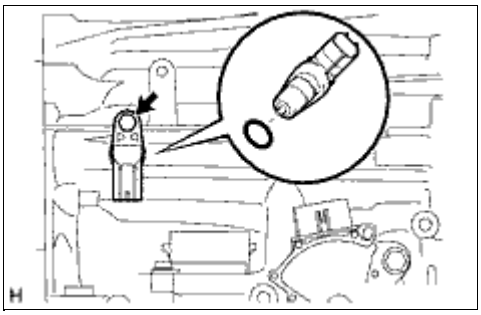


(b) Remove the bolt and transmission revolution sensor (NT).

(c) Remove the O-ring from the transmission revolution sensor (NT).

2. REMOVE TRANSMISSION REVOLUTION SENSOR (SP2)

(a) Disconnect the transmission revolution sensor (SP2) connector.



(b) Remove the bolt and transmission revolution sensor (SP2).

(c) Remove the O-ring from the transmission revolution sensor (SP2).

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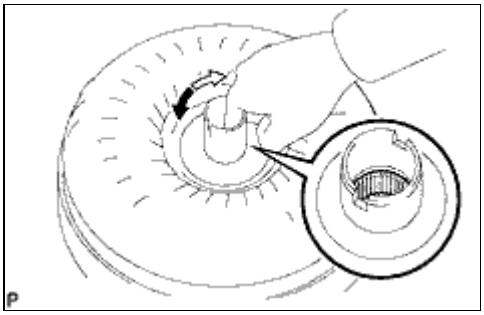
Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000OA102XX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TORQUE CONVERTER AND DRIVE PLATE: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TORQUE CONVERTER ASSEMBLY

(a) Inspect the one-way clutch.

(1) Press on the spline of the stator with a finger and rotate the spline. Check that the spline rotates smoothly when turned clockwise and rotates with difficulty when turned counterclockwise.



Text in Illustration

➡	Difficult
⇨	Smooth

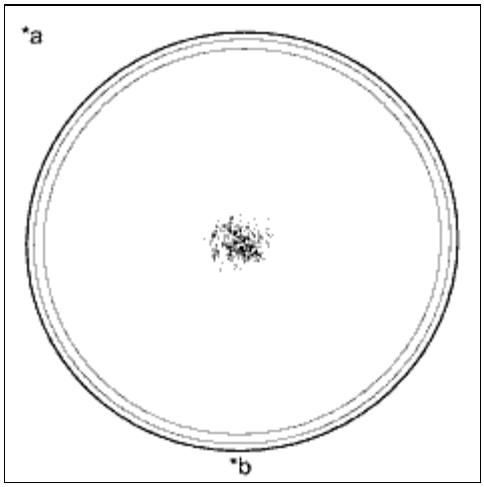
If necessary, clean the torque converter assembly and recheck the one-way clutch. Replace the torque converter assembly if the one-way clutch still fails the inspection.

(b) Inspect the torque converter assembly.

If any of the following problems are present, replace the torque converter assembly.

Text in Illustration

*a	Sample showing maximum allowable amount of powder in ATF
*b	Full Scale



- A metallic sound is emitted from the torque converter assembly during the stall test or when the shift lever is moved to N.
- The one-way clutch turns smoothly or locks in both directions.
- The amount of powder in the ATF is more than the sample shown in the illustration (refer to the sample).

HINT:

The sample shows approximately 0.025 liters (0.026 US qts,

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0.022 Imp. qts) of ATF in Petri dish, which has been taken from a torque converter assembly.

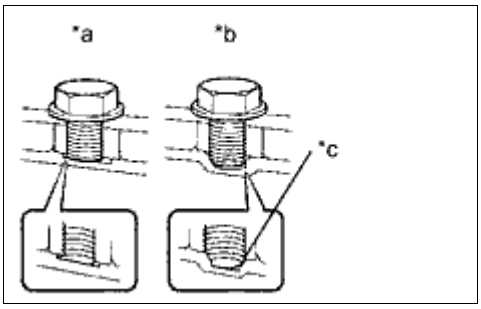
(c) Replace the ATF in the torque converter assembly.

(1) If the ATF is discolored or has a foul odor, stir the ATF in the torque converter assembly and drain it before replacing the ATF.

(d) Prevent deformation of the torque converter and damage to the oil pump gear.

Text in Illustration

*a	Correct
*b	Incorrect
*c	Bottom is damaged



NOTICE:

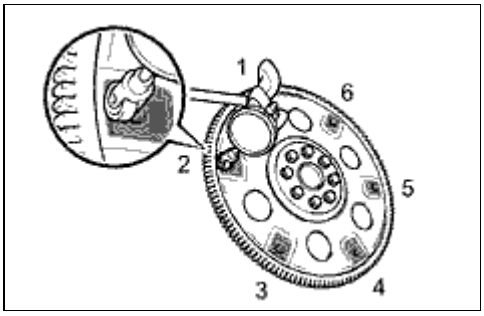
Make sure that all of the bolts are the same length and that the specified bolts are used.

HINT:

If there is any damage to the tip of a bolt for the torque converter assembly or to the bottom of a bolt hole, replace the bolt and torque converter assembly.

2. INSPECT DRIVE PLATE AND RING GEAR SUB-ASSEMBLY

(a) Check the drive plate for damage.



Text in Illustration

▬	Measurement Point

(b) Set up a dial indicator and measure the runout at the 6 areas on the drive plate surface that contact the torque converter assembly.

Maximum runout:
0.30 mm (0.0118 in.)

If the runout is more than the maximum or the drive plate is damaged, replace the drive plate.

for 2GR-FKS: INFO

for 2TR-FE: INFO

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Last Modified: 11-13-2015	6.6 N	**Doc ID:** RM000005VSH001X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: ADJUSTMENT; 2016 MY Tacoma [08/2015 -]		

ADJUSTMENT

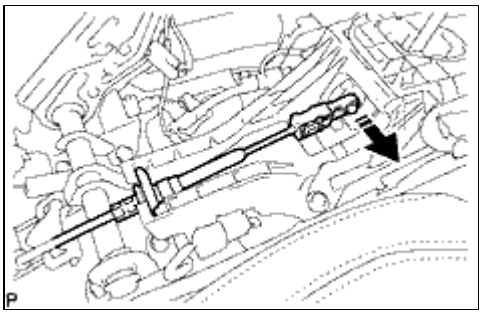
1. REMOVE FRONT CONSOLE BOX

INFO

2. ADJUST TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Move the shift lever to N.

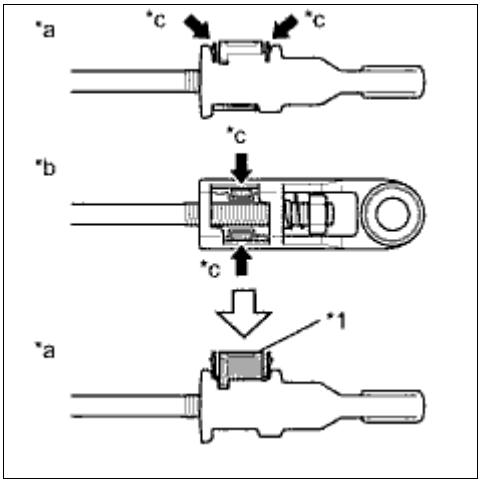
(b) Disconnect the end of the transmission control cable assembly from the transmission floor shift assembly.



Text in Illustration

➡	Disconnect in this Direction

(c) Push the 2 claws together at the top of the transmission control cable lock piece. While holding the 2 claws together, push the 2 lugs on the bottom of the lock piece toward each other and upward to pull out the lock piece.

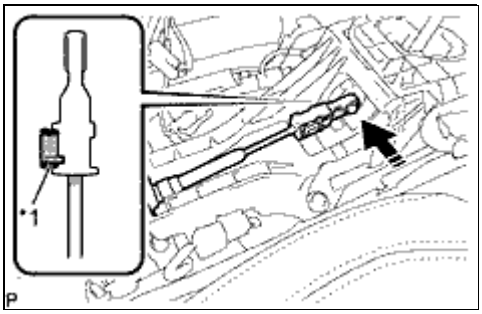


Text in Illustration

*1	Lock Piece
*a	Side View
*b	Bottom View
*c	Push

(d) Connect the end of the transmission control cable assembly to the transmission floor shift assembly.

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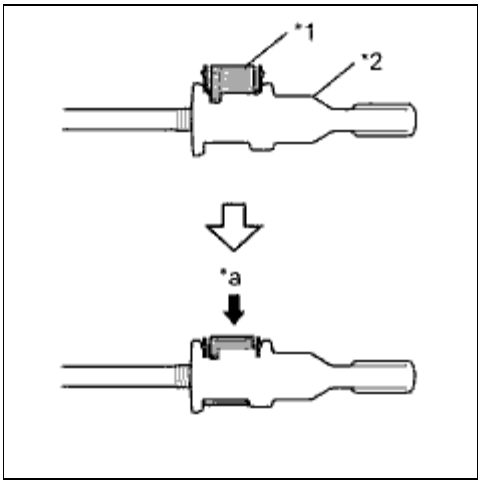
Text in Illustration

*1	Lock Piece
➡	Connect in this Direction

NOTICE:

- Check that the park/neutral position switch and shift lever are in N.
- Make sure that the lock piece is pulled up.
- Push on the end of the cable all the way to the base of the transmission floor shift assembly pin.

(e) Push the lock piece into the adjuster case.



Text in Illustration

*1	Lock Piece
*2	Adjuster Case
*a	Push

NOTICE:

Securely push in the lock piece until it locks.

(f) After adjusting the shift lever position, check the operation and function of the shift lever. If there is a problem, adjust the position again.

3. INSTALL FRONT CONSOLE BOX

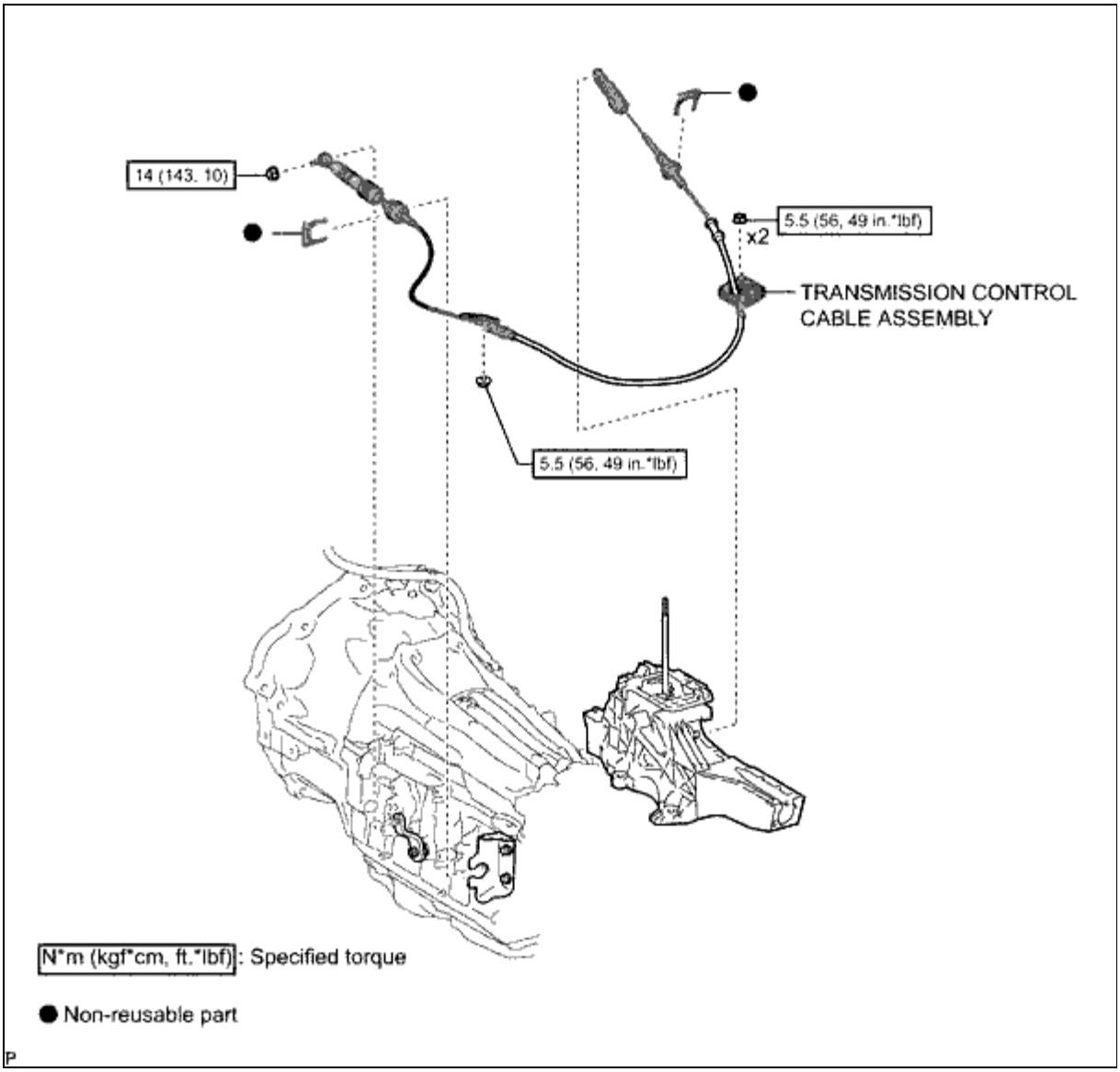
INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005NPB007X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000002ZLK04FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Install the transmission control cable assembly from outside the vehicle body and attach the 3 claws of the cable retainer.

(b) Install the 2 nuts.

Torque:

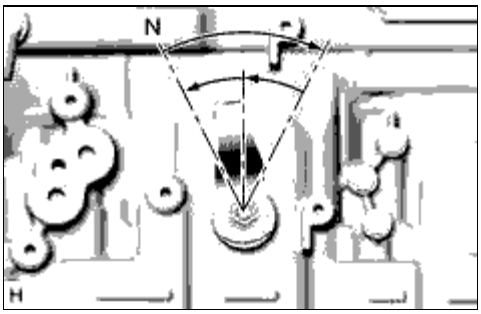
5.5 N·m {56 kgf·cm, 49in·lbf}

(c) Connect the transmission control cable support to the vehicle body with the nut.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(d) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(e) Connect the transmission control cable assembly to the transmission control cable bracket with a new clip, and then connect the cable end to the transmission control shaft lever LH with the nut.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

2. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY INFO

3. INSPECT SHIFT LEVER POSITION INFO

4. REMOVE FRONT CONSOLE BOX

INFO

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000002ZLM04FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

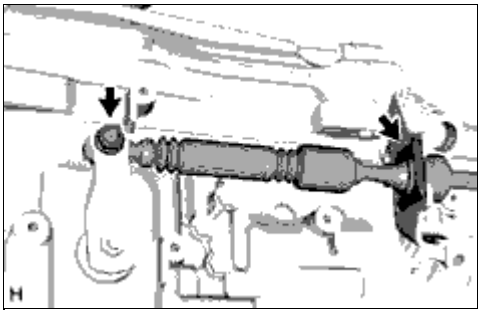
1. REMOVE FRONT CONSOLE BOX

INFO

2. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY INFO

3. REMOVE TRANSMISSION CONTROL CABLE ASSEMBLY

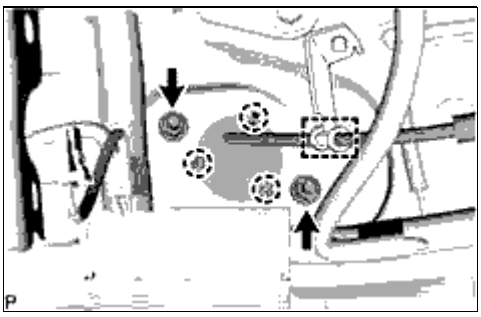
(a) Remove the nut and clip and disconnect the transmission control cable assembly from the automatic transmission assembly.



(b) Remove the nut and disconnect the transmission control cable assembly from the vehicle body.



(c) Detach the clamp to disconnect the transmission control cable support from the transmission control cable clamp.



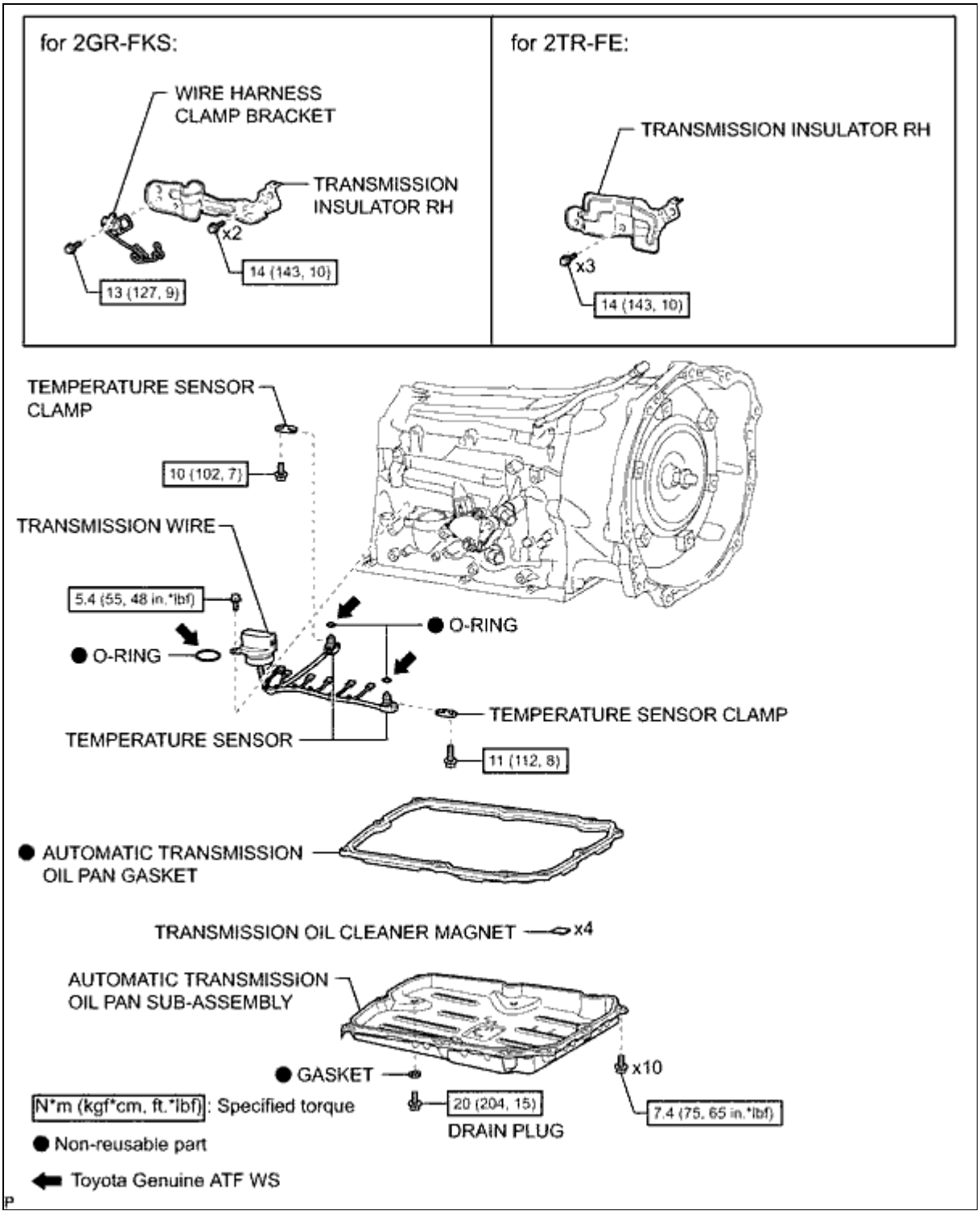
(d) Remove the 2 nuts and detach the 3 claws, and then pull out the transmission control cable assembly from the vehicle body.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9S01JX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000UKG027X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TRANSMISSION WIRE

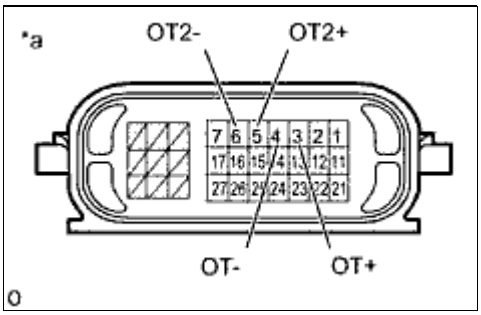
(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Transmission Wire)

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
3 (OT+) - Body ground 5 (OT2+) - Body ground	Always	10 kΩ or higher
4 (OT-) - Body ground 6 (OT2-) - Body ground	Always	10 kΩ or higher



HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

Standard Resistance:

ATF TEMPERATURE	SPECIFIED CONDITION
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

If the result is not as specified, replace the transmission wire.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000ODT01ZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION WIRE

(a) Coat 2 new O-rings with ATF, and install them to the 2 temperature sensors.

(b) Coat a new O-ring with ATF, and install it to the transmission wire.

(c) Install the transmission wire to the automatic transmission case sub-assembly with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

(d) Connect the transmission wire connector.

HINT:

Push up the lever until the claw of the transmission wire connector makes a connection sound.

2. INSTALL TRANSMISSION INSULATOR RH (for 2GR-FKS)

(a) Install the transmission insulator RH to the automatic transmission assembly with the 2 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Install the wire harness clamp bracket to the transmission insulator RH with the bolt.

Torque:

13 N·m {127 kgf·cm, 9ft·lbf}

3. INSTALL TRANSMISSION INSULATOR RH (for 2TR-FE)

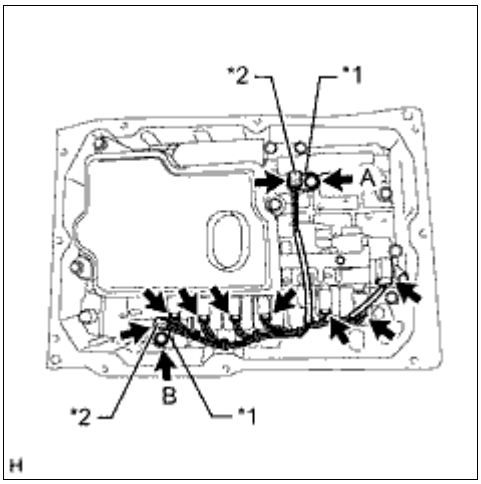
(a) Install the transmission insulator RH to the automatic transmission assembly with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

4. CONNECT TRANSMISSION WIRE

(a) Connect the 7 solenoid valve connectors.



Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Install the 2 temperature sensors and 2 temperature sensor clamps to the transmission valve body

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assembly with the bolt.

Torque:

for Bolt A -

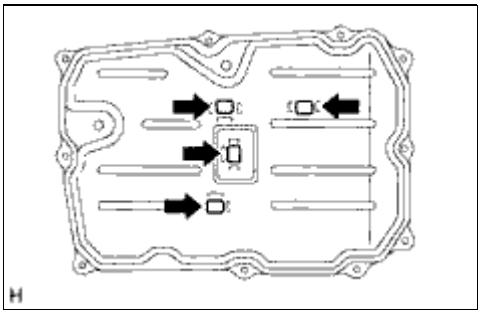
10 N·m {102 kgf·cm, 7ft·lbf}

for Bolt B -

11 N·m {112 kgf·cm, 8ft·lbf}

5. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Install the 4 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly as shown in the illustration.

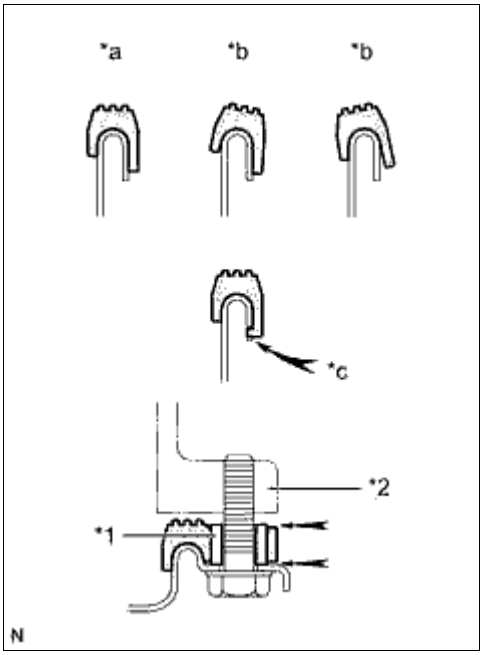


(b) Install a new automatic transmission oil pan gasket to the automatic transmission oil pan sub-assembly.

(c) Install the automatic transmission oil pan sub-assembly with automatic transmission oil pan gasket to the automatic transmission case sub-assembly with the 10 bolts.

Text in Illustration

*1	Sleeve
*2	Automatic Transmission Case Sub-assembly
*a	Correct
*b	Incorrect
*c	Protrusion



Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}

NOTICE:

- Make sure that the automatic transmission oil pan gasket seal surface and automatic transmission oil pan sub-assembly contact surface are free of oil and foreign matter.
- Install the automatic transmission oil pan gasket so that there is no slack in the automatic transmission oil pan gasket, and the entire seal surface is level.
- Make sure that the 8 protrusions are properly engaged to the automatic transmission oil pan sub-assembly.
- When installing the automatic transmission oil pan sub-assembly, make sure that the automatic transmission oil pan gasket is not pinched between the sleeve and the seal surface of the automatic transmission case sub-assembly.

6. ADD AUTOMATIC TRANSMISSION FLUID

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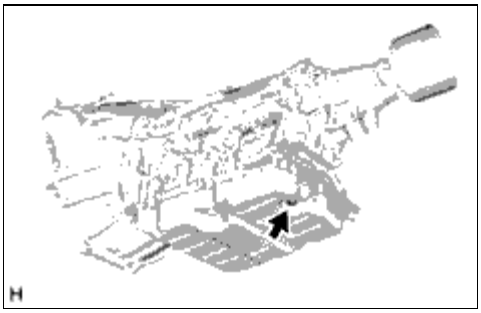
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000ODV01TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. DRAIN AUTOMATIC TRANSMISSION FLUID

(a) Remove the drain plug and gasket from the automatic transmission assembly and drain the ATF.



(b) Install a new gasket and the drain plug to the automatic transmission assembly.

Torque:

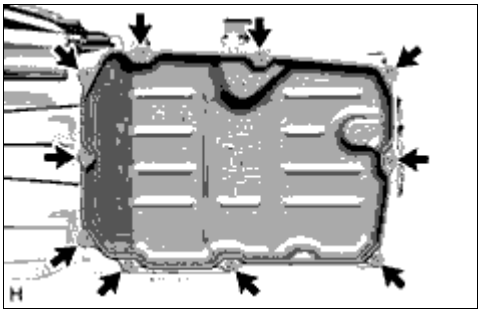
20 N·m {204 kgf·cm, 15ft·lbf}

2. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Remove the 10 bolts, automatic transmission oil pan sub-assembly and automatic transmission oil pan gasket from the automatic transmission case sub-assembly.

NOTICE:

Some fluid will remain in the automatic transmission oil pan sub-assembly. Remove all of the bolts, and carefully remove the automatic transmission oil pan sub-assembly.



(b) Remove the 4 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

(c) Examine the particles in the automatic transmission oil pan sub-assembly.

(1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.

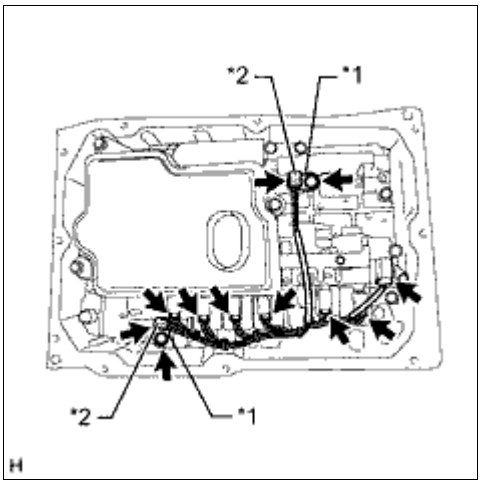
Steel (magnetic): bearing, gear and clutch plate wear

Brass (non-magnetic): bush wear

3. DISCONNECT TRANSMISSION WIRE

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(a) Remove the 2 bolts and the 2 temperature sensor clamps, and disconnect the 2 temperature sensors.



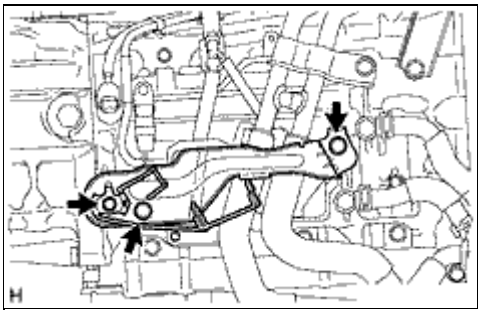
Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Disconnect the 7 solenoid valve connectors and transmission wire from the transmission valve body assembly.

4. REMOVE TRANSMISSION INSULATOR RH (for 2GR-FKS)

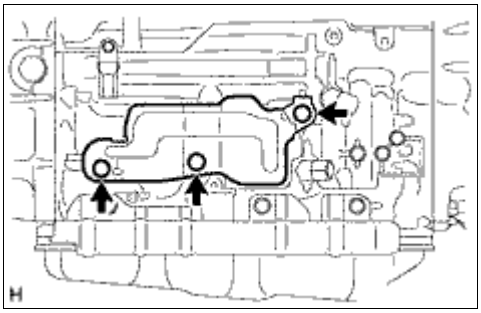
(a) Remove the bolt and wire harness clamp bracket from the transmission insulator RH.



(b) Remove the 2 bolts and transmission insulator RH from the automatic transmission assembly.

5. REMOVE TRANSMISSION INSULATOR RH (for 2TR-FE)

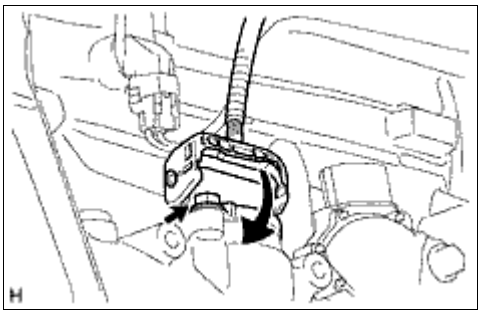
(a) Remove the 3 bolts and transmission insulator RH from the automatic transmission assembly.



6. REMOVE TRANSMISSION WIRE

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(a) Disconnect the transmission wire connector.

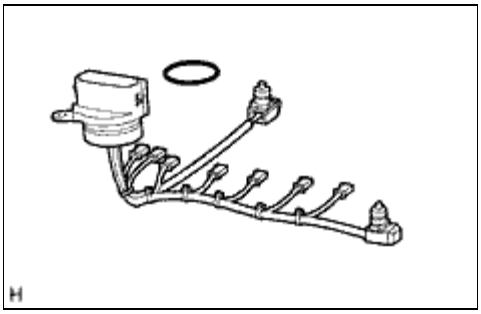


HINT:

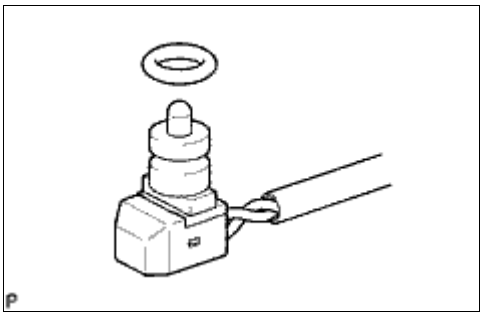
Detach the claw, press down the lever, and disconnect the transmission wire connector.

(b) Remove the bolt and pull out the transmission wire from the automatic transmission case sub-assembly.

(c) Remove the O-ring from the connector of transmission wire.



(d) Remove the 2 O-rings from the 2 temperature sensors.

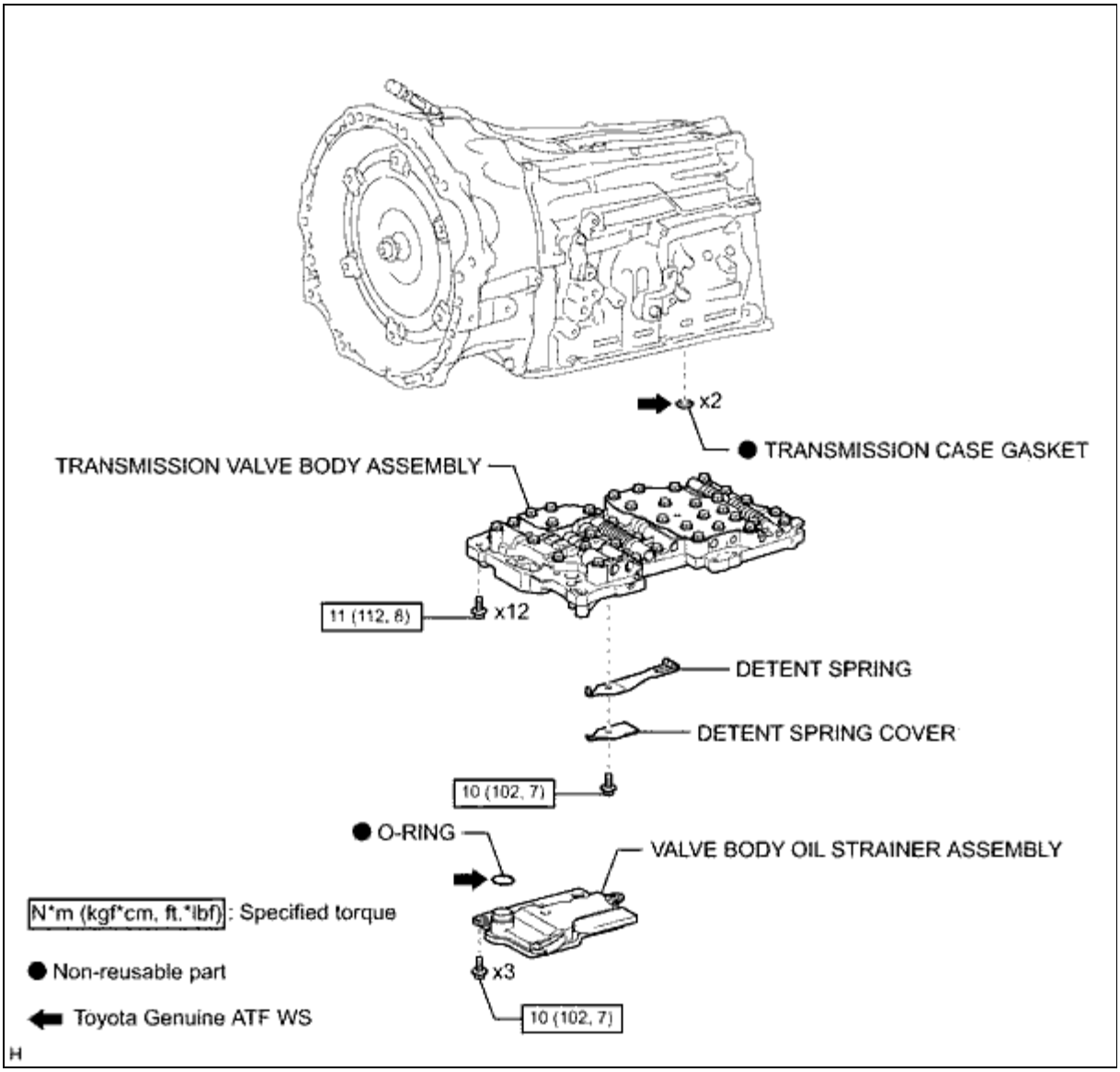


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9Q01WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

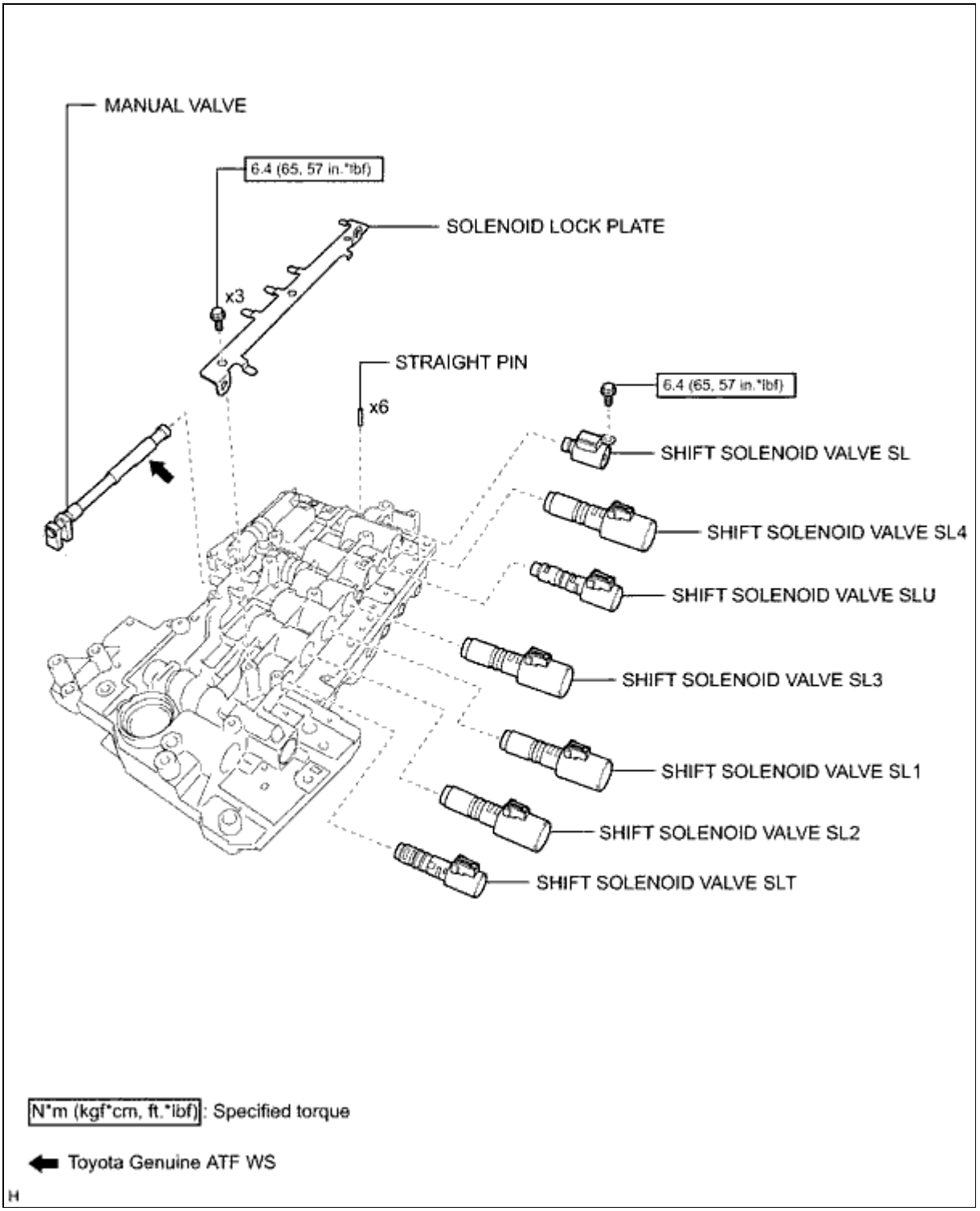
COMPONENTS

ILLUSTRATION



ILLUSTRATION

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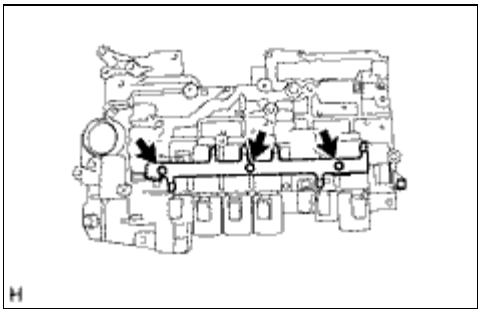
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9L07VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

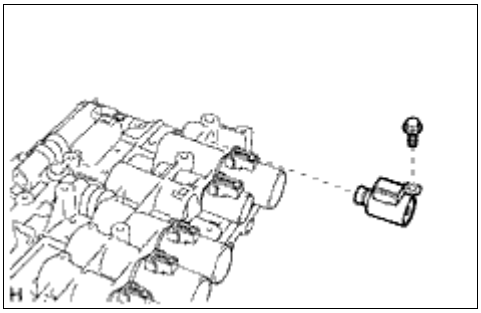
1. REMOVE SOLENOID LOCK PLATE

(a) Remove the 3 bolts and solenoid lock plate from the transmission valve body assembly.



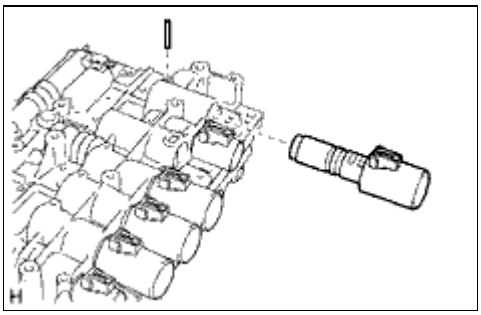
2. REMOVE SHIFT SOLENOID VALVE SL

(a) Remove the bolt and shift solenoid valve SL from the transmission valve body assembly.



3. REMOVE SHIFT SOLENOID VALVE SL4

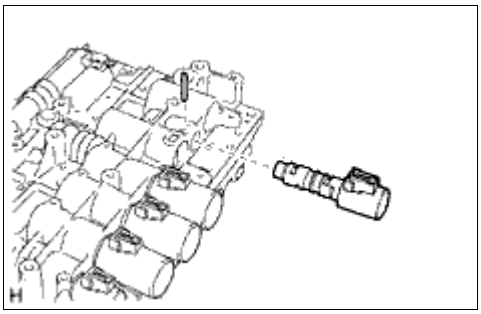
(a) Remove the straight pin and shift solenoid valve SL4 from the transmission valve body assembly.



4. REMOVE SHIFT SOLENOID VALVE SLU

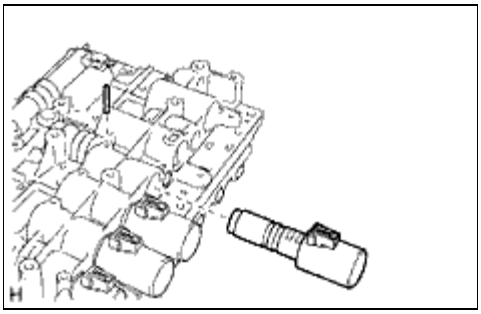
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(a) Remove the straight pin and shift solenoid valve SLU from the transmission valve body assembly.



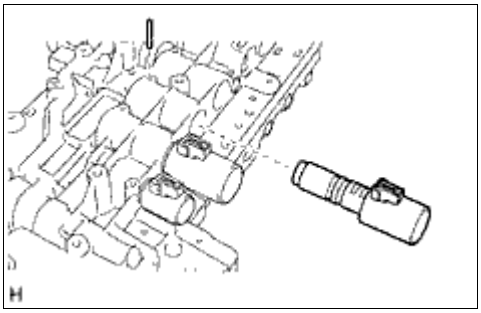
5. REMOVE SHIFT SOLENOID VALVE SL3

(a) Remove the straight pin and shift solenoid valve SL3 from the transmission valve body assembly.



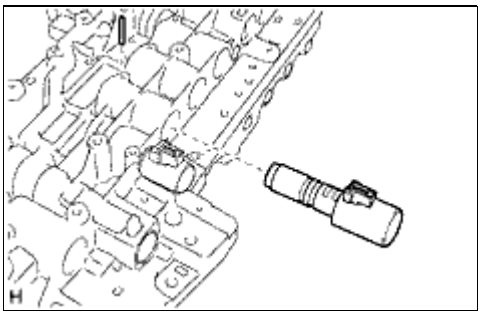
6. REMOVE SHIFT SOLENOID VALVE SL1

(a) Remove the straight pin and shift solenoid valve SL1 from the transmission valve body assembly.



7. REMOVE SHIFT SOLENOID VALVE SL2

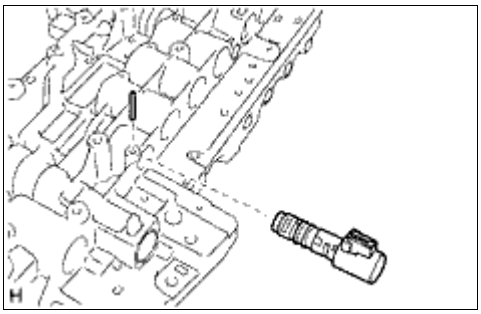
(a) Remove the straight pin and shift solenoid valve SL2 from the transmission valve body assembly.



8. REMOVE SHIFT SOLENOID VALVE SLT

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(a) Remove the straight pin and shift solenoid valve SLT from the transmission valve body assembly.



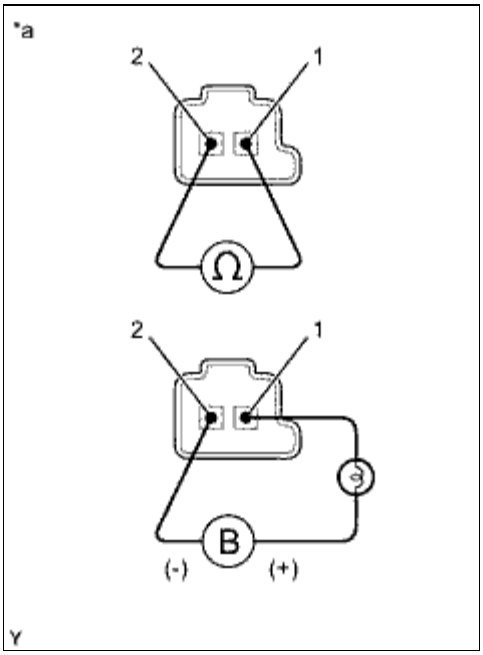
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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000ODH06FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT SHIFT SOLENOID VALVE SL1

(a) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve SL1)

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

If the value is not as specified, replace the shift solenoid valve SL1.

(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

If the operation cannot be done as specified, replace the shift solenoid valve SLT.

2. INSPECT SHIFT SOLENOID VALVE SL2

HINT:

Refer to Inspect Shift Solenoid Valve SL1.

3. INSPECT SHIFT SOLENOID VALVE SL3

HINT:

Refer to Inspect Shift Solenoid Valve SL1.

4. INSPECT SHIFT SOLENOID VALVE SL4

HINT:

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Refer to Inspect Shift Solenoid Valve SL1.

5. INSPECT SHIFT SOLENOID VALVE SLU

HINT:

Refer to Inspect Shift Solenoid Valve SL1.

6. INSPECT SHIFT SOLENOID VALVE SLT

HINT:

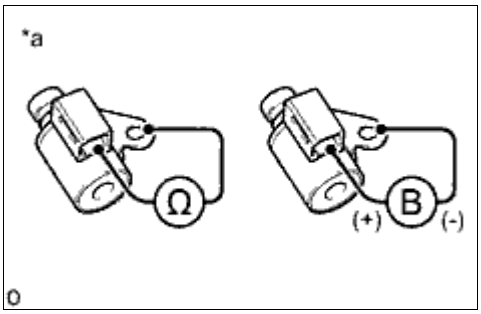
Refer to Inspect Shift Solenoid Valve SL1.

7. INSPECT SHIFT SOLENOID VALVE SL

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve SL)



Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

If the value is not as specified, replace the shift solenoid valve SL.

(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9I02EX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION CASE GASKET

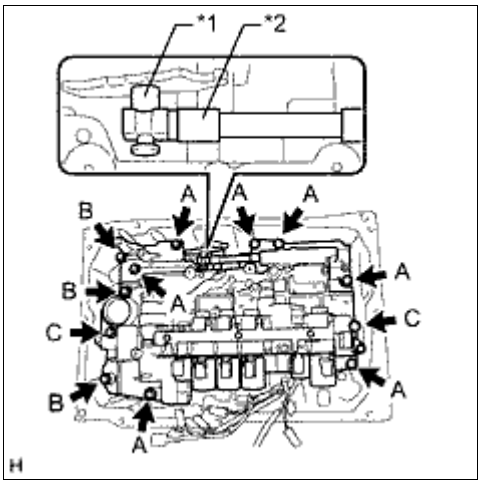
(a) Install 2 new transmission case gaskets to the automatic transmission case sub-assembly.

2. INSTALL MANUAL VALVE

(a) Coat the manual valve with ATF and install it to the transmission valve body assembly.

3. INSTALL TRANSMISSION VALVE BODY ASSEMBLY

(a) Insert the manual valve lever sub-assembly into the groove on the end of the manual valve and install the transmission valve body assembly to the automatic transmission case sub-assembly with the 12 bolts.



Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Manual Valve

Torque:

11 N·m {112 kgf·cm, 8ft·lbf}

HINT:

Bolt length:

- Bolt A: 25 mm (0.984 in.)
- Bolt A: 36 mm (1.42 in.)
- Bolt A: 50 mm (1.97 in.)

(b) Install the detent spring and detent spring cover to the transmission valve body assembly with the bolt.

Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

4. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the valve body oil strainer assembly.

(b) Install the valve body oil strainer assembly to the transmission valve body assembly with the 3 bolts.

Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

5. CONNECT TRANSMISSION WIRE

INFO

6. CHECK AUTOMATIC TRANSMISSION SYSTEM

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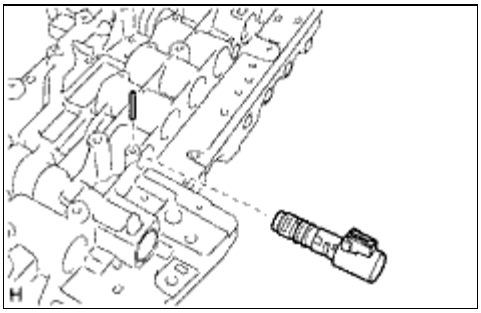
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9M07VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

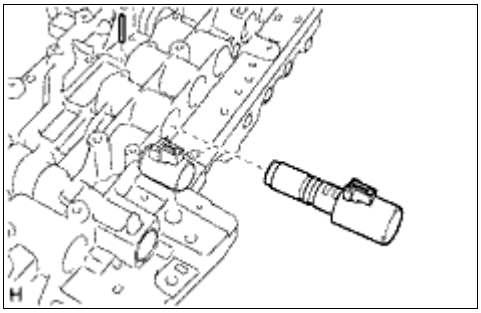
1. INSTALL SHIFT SOLENOID VALVE SLT

(a) Install the shift solenoid valve SLT and straight pin to the transmission valve body assembly.



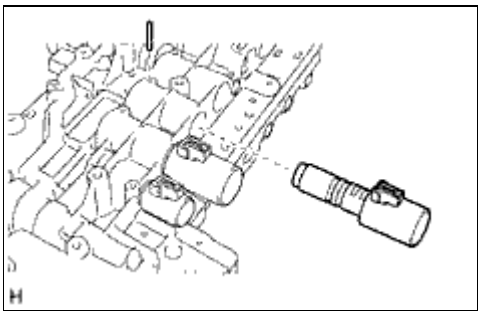
2. INSTALL SHIFT SOLENOID VALVE SL2

(a) Install the shift solenoid valve SL2 and straight pin to the transmission valve body assembly.



3. INSTALL SHIFT SOLENOID VALVE SL1

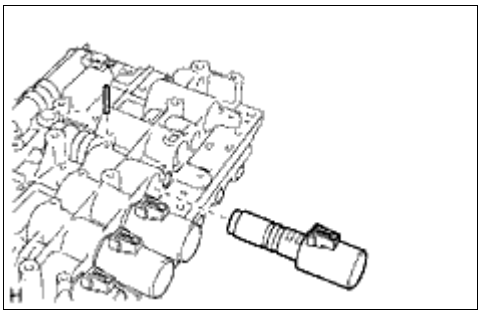
(a) Install the shift solenoid valve SL1 and straight pin to the transmission valve body assembly.



4. INSTALL SHIFT SOLENOID VALVE SL3

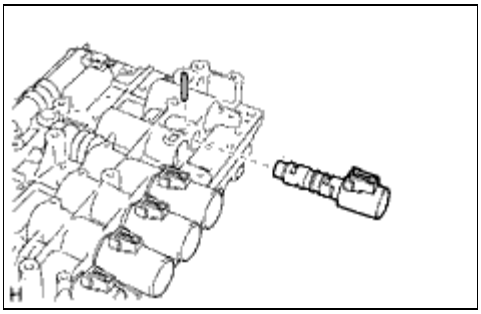
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(a) Install the shift solenoid valve SL3 and straight pin to the transmission valve body assembly.



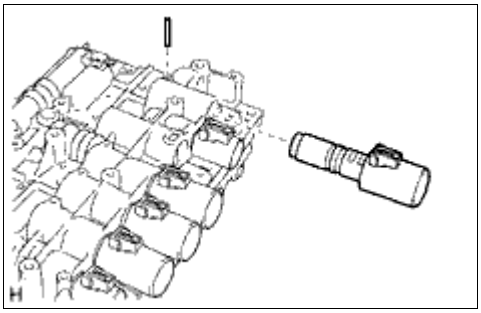
5. INSTALL SHIFT SOLENOID VALVE SLU

(a) Install the shift solenoid valve SLU and straight pin to the transmission valve body assembly.



6. INSTALL SHIFT SOLENOID VALVE SL4

(a) Install the shift solenoid valve SL4 and straight pin to the transmission valve body assembly.

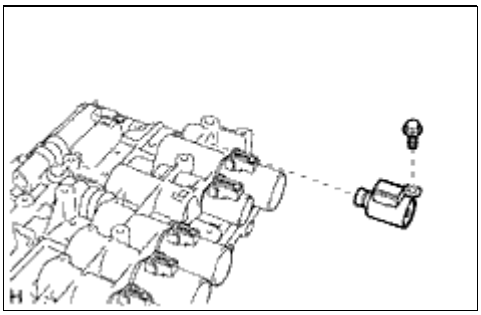


7. INSTALL SHIFT SOLENOID VALVE SL

(a) Install the shift solenoid valve SL and straight pin to the transmission valve body assembly.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



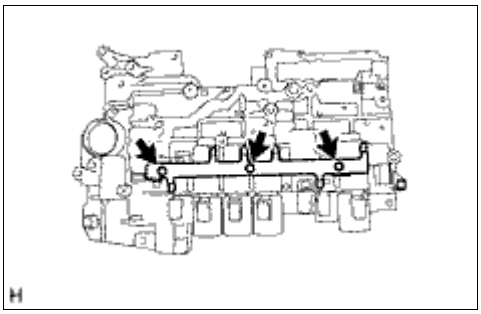
8. INSTALL SOLENOID LOCK PLATE

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(a) Install the solenoid lock plate to the transmission valve body assembly with the 3 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9K027X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60E AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: REMOVAL; 2016 MY Tacoma [08/2015 -]		

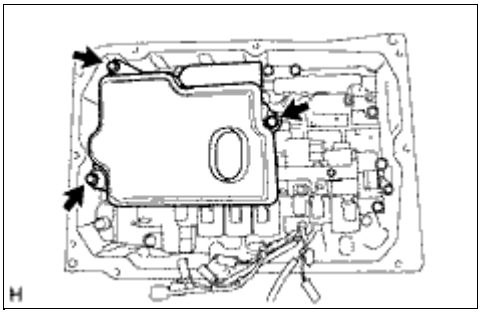
REMOVAL

1. DISCONNECT TRANSMISSION WIRE

INFO

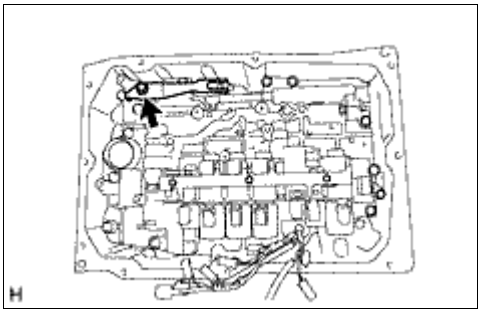
2. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

(a) Remove the 3 bolts and valve body oil strainer assembly from the transmission valve body assembly.

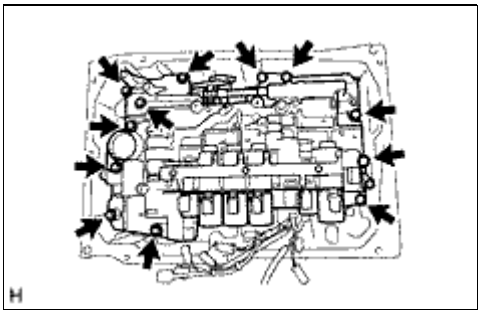


3. REMOVE TRANSMISSION VALVE BODY ASSEMBLY

(a) Remove the bolt, detent spring cover and detent spring from the transmission valve body assembly.



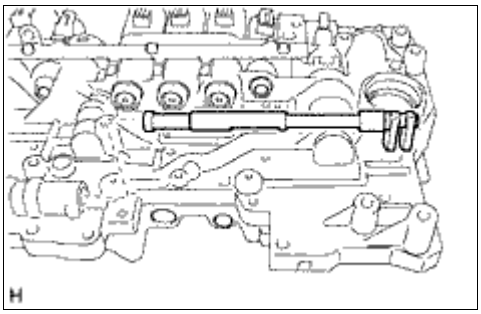
(b) Remove the 12 bolts and transmission valve body assembly from the automatic transmission case sub-assembly.



4. REMOVE MANUAL VALVE

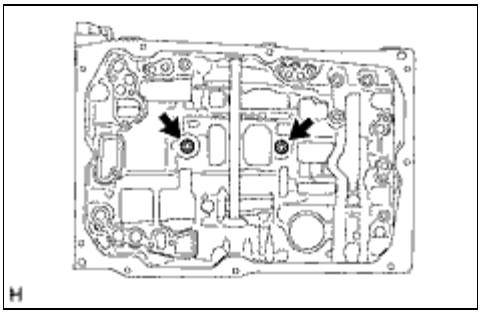
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(a) Remove the manual valve from the transmission valve body assembly.



5. REMOVE TRANSMISSION CASE GASKET

(a) Remove the 2 transmission case gaskets from the automatic transmission case sub-assembly.

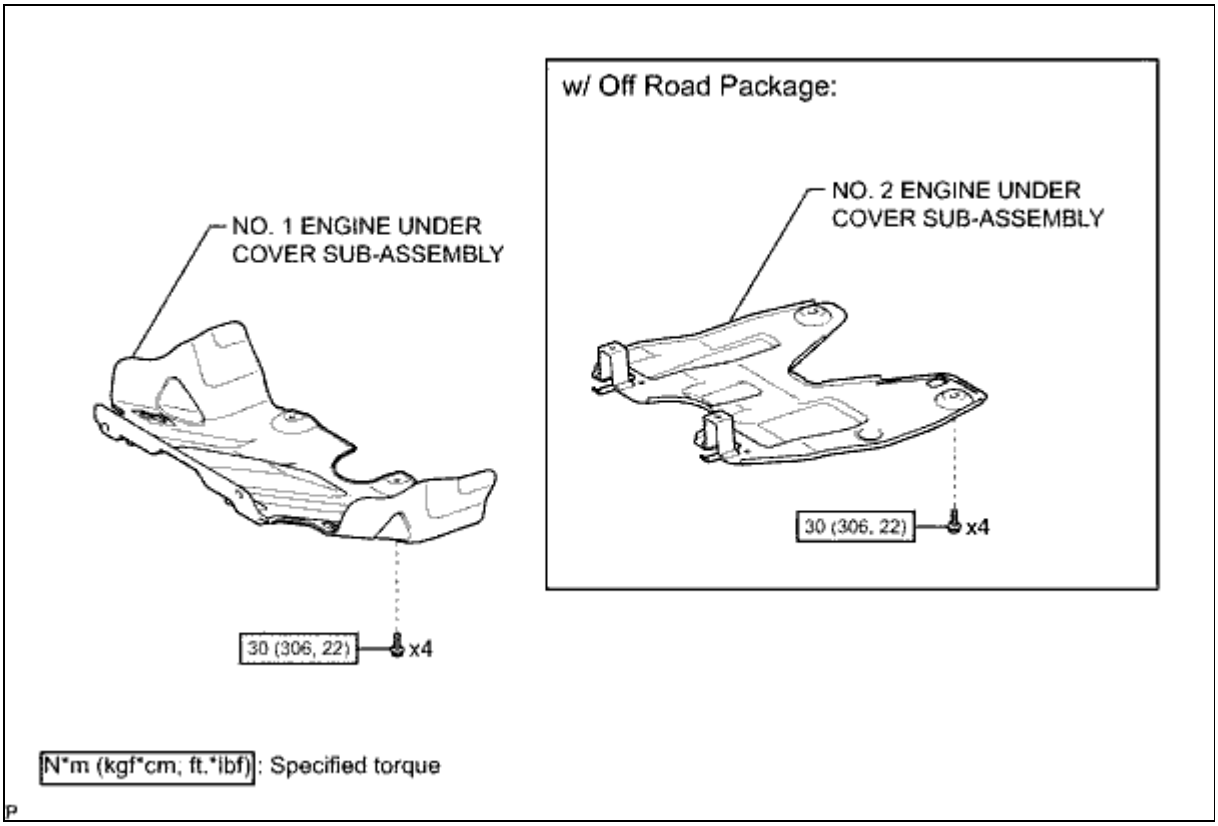


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM0000018ZC04WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2GR-FKS): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

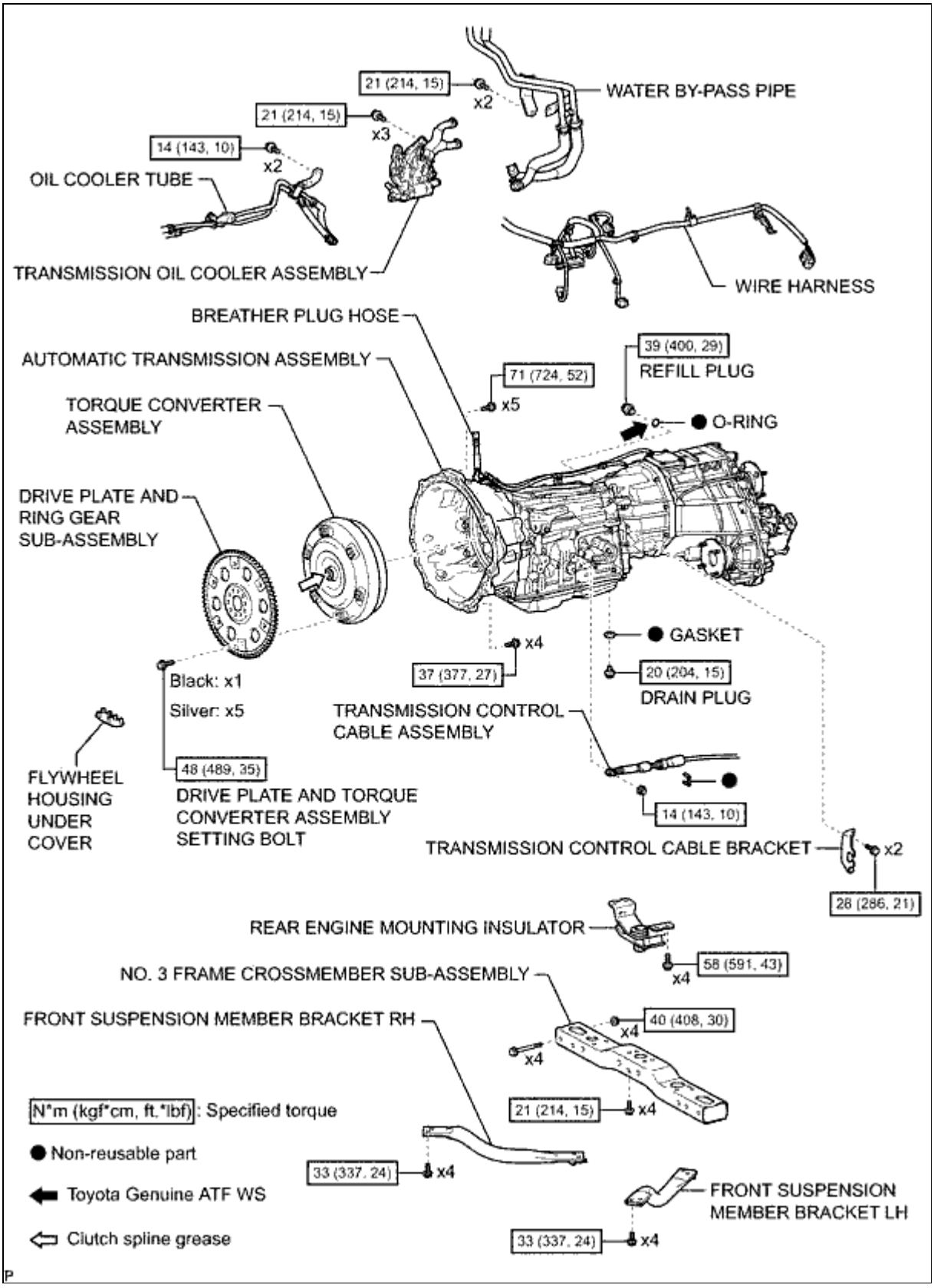
COMPONENTS

ILLUSTRATION



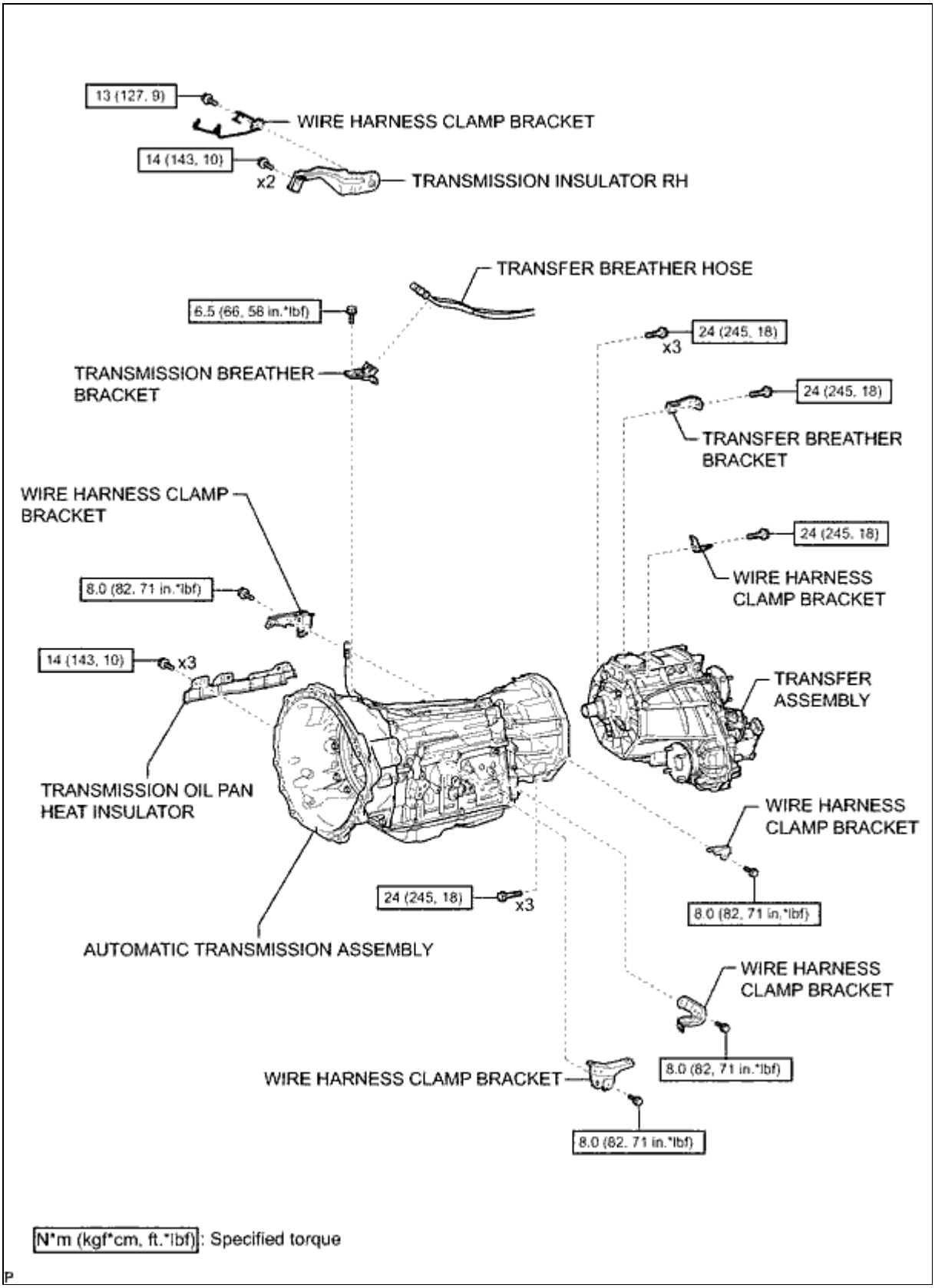
ILLUSTRATION

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ILLUSTRATION

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000018ZB065X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2GR-FKS): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL WIRE HARNESS CLAMP BRACKET

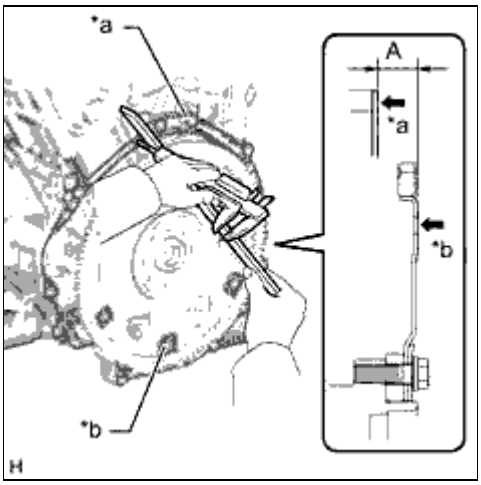
HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.

(a) Attach the 8 clamps and claw to install the 4 wire harness clamp brackets to the wire harness.

2. INSTALL TORQUE CONVERTER ASSEMBLY

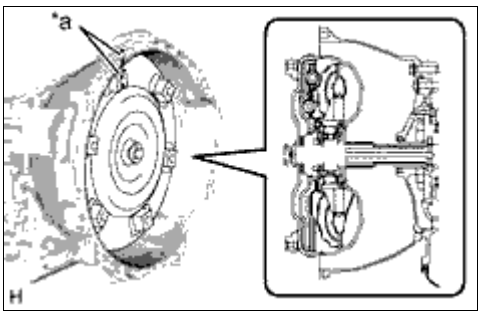
(a) Using a vernier caliper and straightedge, measure the dimension (A) between the automatic transmission assembly contact surface of the engine assembly (*a) and the torque converter assembly contact surface of the drive plate (*b).



Text in Illustration

*a	Engine Surface
*b	Drive Plate Surface

(b) Align the matchmark on the automatic transmission case sub-assembly with the one on the torque converter assembly and engage the splines of the input shaft with the turbine runner splines.



Text in Illustration

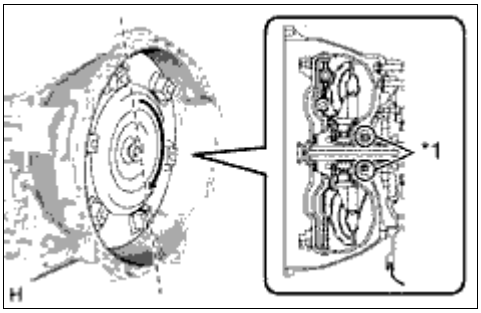
*a	Matchmark

NOTICE:

Install the torque converter assembly to the input shaft while keeping it horizontal.

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(c) Rotate the torque converter assembly approximately 180° and engage the splines of the stator shaft with the stator assembly.



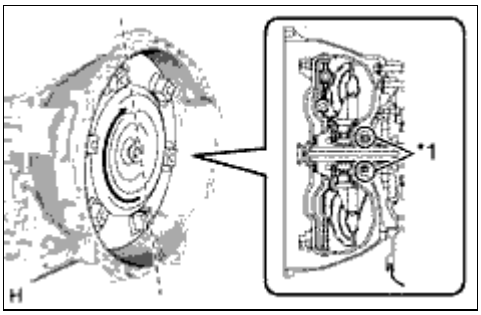
Text in Illustration

*1	Front Oil Pump Oil Seal

NOTICE:

- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(d) Rotate the torque converter assembly approximately 180° again, align the matchmark on the torque converter assembly with the one on the automatic transmission case sub-assembly and insert the key of the torque converter assembly into the groove of the oil pump drive gear.



Text in Illustration

*1	Front Oil Pump Oil Seal

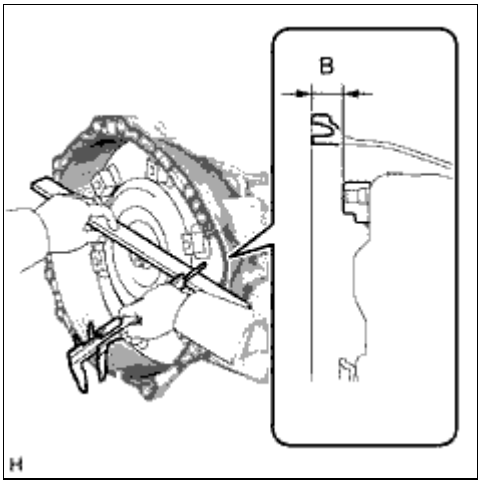
NOTICE:

- Do not push the torque converter assembly excessively when rotating it.
- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(e) Using a vernier caliper and straightedge, measure the dimension (B) shown in the illustration and check that the dimension (B) is more than the dimension (A), which was measured in the previous step.

Standard distance:

B = A + 1 mm (0.0394 in.) or more



NOTICE:

- Make sure to deduct the thickness of the straightedge.
- If the automatic transmission assembly is installed to the engine assembly with the torque converter assembly not sufficiently inserted, the torque converter assembly may be damaged.

3. INSTALL TRANSMISSION OIL PAN HEAT INSULATOR

HINT:

It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

(a) Install the transmission oil pan heat insulator to the automatic transmission assembly with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

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4. INSTALL TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

(a) Install the transmission control cable bracket to the automatic transmission assembly with the 2 bolts.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

5. INSTALL TRANSMISSION BREATHER BRACKET

HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

(a) Install the transmission breather bracket to the automatic transmission assembly with the bolt.

Torque:

6.5 N·m {66 kgf·cm, 58in·lbf}

6. INSTALL TRANSMISSION OIL COOLER ASSEMBLY

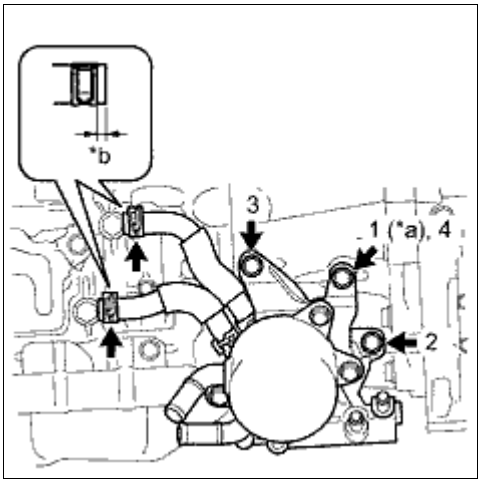
NOTICE:

Make sure to install the clips so that the spool fitting is not overlapped.

HINT:

It is not necessary to remove the transmission oil cooler assembly unless it is being replaced.

(a) Install the transmission oil cooler assembly with transmission oil thermostat to the automatic transmission assembly with the 3 bolts in the order shown in the illustration.



Text in Illustration

*a	Temporarily Tighten
*a	2 to 7 mm (0.0788 to 0.2755 in.)

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

(b) Connect the 2 oil cooler hoses to the automatic transmission assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

7. INSTALL TRANSFER ASSEMBLY INFO

8. INSTALL FLYWHEEL HOUSING UNDER COVER

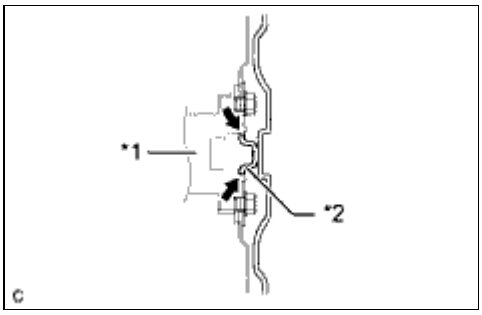
(a) Install the flywheel housing under cover to the engine assembly.

9. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY

(a) Apply clutch spline grease to the surface of the crankshaft that contacts the torque converter assembly

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centerpiece.

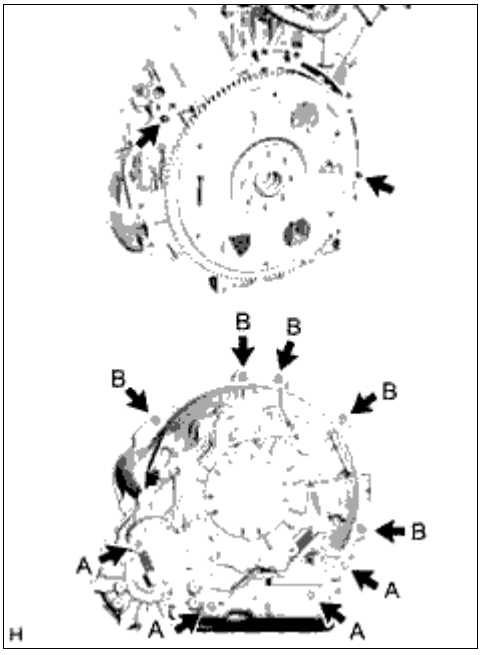


Text in Illustration

*1	Crankshaft
*2	Torque Converter Assembly Centerpiece
➡	Clutch Spline Grease

Clutch spline grease:
Toyota Genuine Clutch Spline Grease or equivalent
Maximum grease amount
Approximately 1 g (0.0353 oz.)

(b) Confirm that the 2 knock pins are installed on the engine assembly and are not damaged.



(c) While keeping the engine assembly and automatic transmission assembly horizontal, align the 2 knock pins with the holes in the automatic transmission assembly and install the 9 bolts.

Torque:
for Bolt A -
37 N·m {377 kgf·cm, 27ft·lbf}
for Bolt B -
71 N·m {724 kgf·cm, 52ft·lbf}

NOTICE:

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- Do not use excessive force when installing the automatic transmission assembly.
- Check that the torque converter assembly rotates.
- Make sure that the wire harness or other similar items are not pinched between the contact surfaces.
- Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

10. CONNECT WIRE HARNESS

(a) Tilt down the automatic transmission assembly.

NOTICE:

Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Attach the 4 clamps to connect the wire harness to the automatic transmission assembly and transfer assembly.

(c) Connect the 4 wire harness clamp brackets to the automatic transmission assembly with the 4 bolts.

Torque:

8.0 N·m {82 kgf·cm, 71in·lbf}

(d) Connect the park/neutral position switch connector, transmission wire connector, 2 transmission revolution sensor connectors and transfer connector.

HINT:

Push up the lever until the claw of the transmission wire connector makes a connection sound.

11. CONNECT TRANSFER BREATHER HOSE

(a) Attach the 2 clamps to connect the 2 transfer breather hoses to the wire harness.

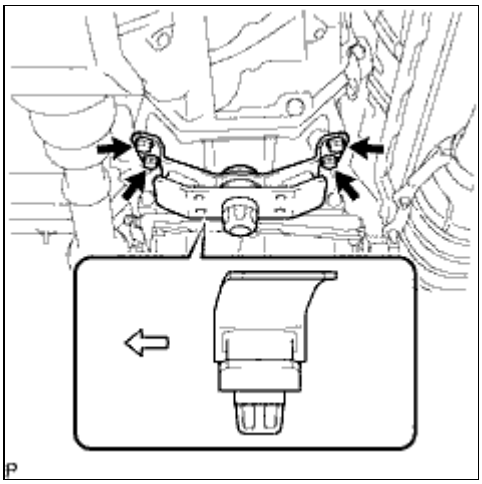
(b) Attach the 2 clamps to connect the 2 transfer breather hoses to the transmission breather bracket.

12. CONNECT BREATHER PLUG HOSE

(a) Attach the 2 clamps to connect the breather plug hose to the transmission breather bracket and wire harness.

13. INSTALL REAR ENGINE MOUNTING INSULATOR

(a) Install the rear engine mounting insulator to the automatic transmission assembly with the 4 bolts as shown in the illustration.



Text in Illustration

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⇨	Front Side

Torque:

58 N·m {591 kgf·cm, 43ft·lbf}

14. INSTALL NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

(a) Install the No. 3 frame crossmember sub-assembly to the vehicle body with the 4 bolts and 4 nuts.

Torque:

40 N·m {408 kgf·cm, 30ft·lbf}

NOTICE:

Install the nuts so that they face the rear of the vehicle.

HINT:

Hold the bolts while tightening the nuts.

(b) Connect the No. 3 frame crossmember sub-assembly to the rear engine mounting insulator with the 4 bolts.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

15. INSTALL FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Install the front suspension member bracket LH and front suspension member bracket RH to the No. 3 frame crossmember sub-assembly and vehicle body with the 8 bolts.

Torque:

33 N·m {337 kgf·cm, 24ft·lbf}

16. CONNECT WATER BY-PASS PIPE

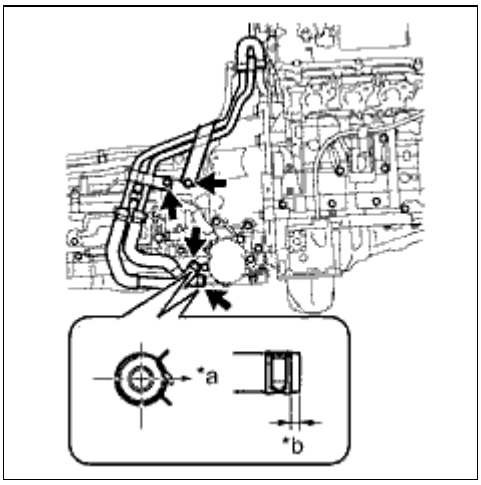
NOTICE:

Make sure to install the clips so that the spool fitting is not overlapped.

(a) Connect the water by-pass pipe to the automatic transmission assembly with the 2 bolts.

Text in Illustration

*a	RH Side
*b	2 to 7 mm (0.0788 to 0.2755 in.)



Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

(b) Connect the 2 water by-pass hoses to the transmission oil cooler assembly, and slide the 2 clips to secure them.

NOTICE:

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Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

17. CONNECT OIL COOLER TUBE

NOTICE:

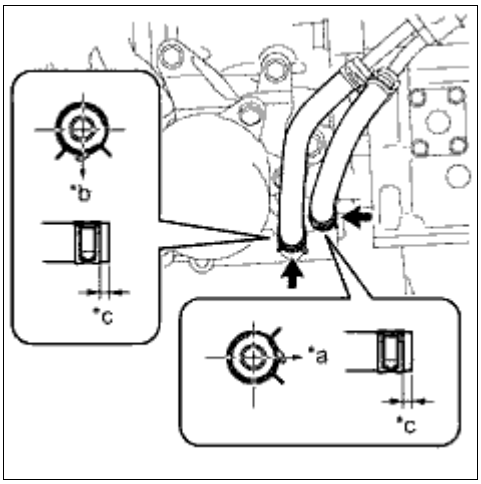
Make sure to install the clips so that the spool fitting is not overlapped.

(a) Connect the 2 oil cooler tubes to the automatic transmission assembly and engine assembly with the 2 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Connect the 2 oil cooler hoses to the transmission oil thermostat, and slide the 2 clips to secure them.



Text in Illustration

*a	Front Side
*b	Lower Side
*c	2 to 7 mm (0.0788 to 0.2755 in.)

NOTICE:

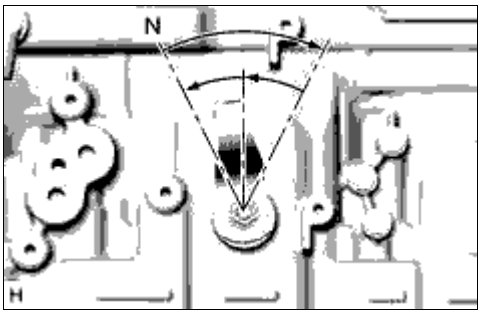
Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

18. INSTALL TRANSMISSION INSULATOR RH INFO

19. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Move the shift lever to N.

(b) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(c) Connect the transmission control cable assembly to the transmission control shaft lever LH with the nut.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(d) Connect the transmission control cable assembly to the transmission control cable bracket with a new clip.

20. INSTALL DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

(a) Turn the crankshaft to gain access to the installation locations of the 6 drive plate and torque converter assembly setting bolts and install each bolt while holding the crankshaft pulley bolt with a wrench.

Torque:

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48 N·m {489 kgf·cm, 35ft·lbf}

NOTICE:

Install the black colored bolt first, and then the remaining 5 silver colored bolts.

21. INSTALL STARTER ASSEMBLY

INFO

22. INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY LH

INFO

23. INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

24. INSTALL FRONT PROPELLER SHAFT ASSEMBLY

INFO

25. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

26. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

27. ADD ENGINE COOLANT INFO

28. ADD TRANSFER OIL INFO

29. ADD AUTOMATIC TRANSMISSION FLUID

INFO

30. INSPECT SHIFT LEVER POSITION INFO

31. INSPECT FOR COOLANT LEAK INFO

32. INSPECT FOR OIL LEAK

(a) Start the engine. Make sure that there are no oil leaks from the areas that were worked on.

33. INSPECT FOR EXHAUST GAS LEAK INFO

34. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

35. INSTALL NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

36. RESET MEMORY

INFO

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000018ZD064X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2GR-FKS): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

CAUTION:

The automatic transmission assembly is very heavy. Be sure to follow the procedure described in the repair manual, or the engine lifter may suddenly drop.

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

3. REMOVE NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

4. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

5. DRAIN ENGINE COOLANT INFO

6. DRAIN TRANSFER OIL INFO

7. DRAIN AUTOMATIC TRANSMISSION FLUID INFO

8. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

9. REMOVE FRONT PROPELLER SHAFT ASSEMBLY

INFO

10. REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY LH

INFO

11. REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

12. REMOVE STARTER ASSEMBLY

INFO

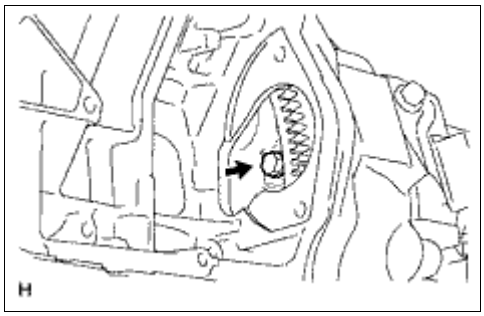
13. REMOVE DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

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(a) Turn the crankshaft to gain access to the removable locations of the 6 drive plate and torque converter assembly setting bolts and remove each bolt while holding the crankshaft pulley bolt with a wrench.

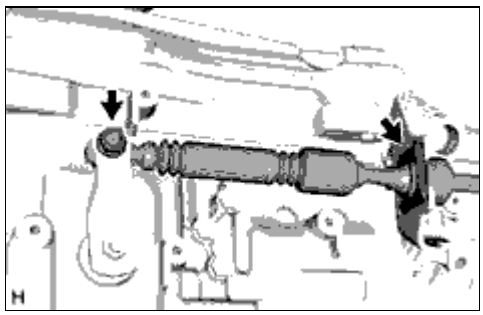
HINT:

There will be one black colored bolt.



14. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Remove the clip and nut and disconnect the transmission control cable assembly from the transmission control shaft lever LH and transmission control cable bracket.



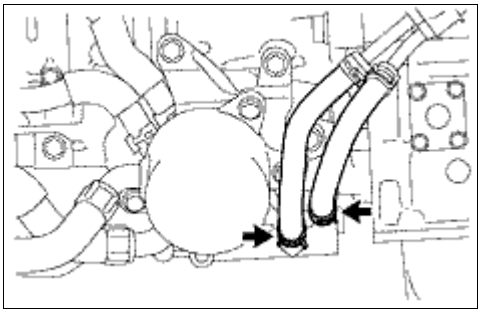
15. REMOVE TRANSMISSION INSULATOR RH INFO

16. DISCONNECT OIL COOLER TUBE

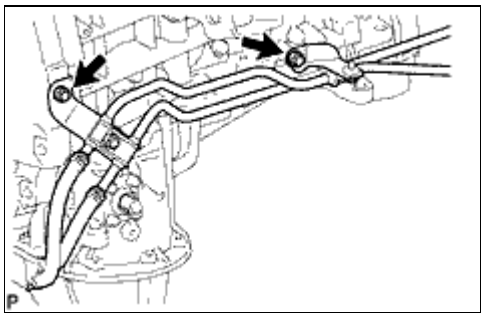
(a) Slide the 2 clips and disconnect the 2 oil cooler hoses from the transmission oil thermostat.

HINT:

Use a container to catch any ATF.



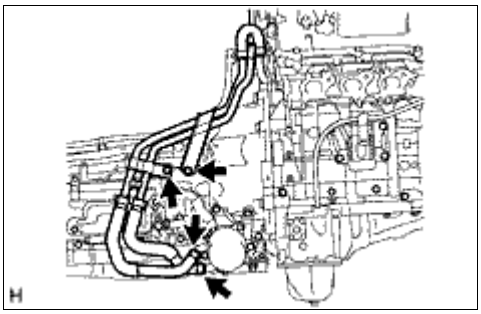
(b) Remove the 2 bolts and disconnect the 2 oil cooler tubes from the automatic transmission assembly and engine assembly.



17. DISCONNECT WATER BY-PASS PIPE

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(a) Slide the 2 clips and disconnect the 2 water by-pass hoses from the transmission oil cooler assembly.



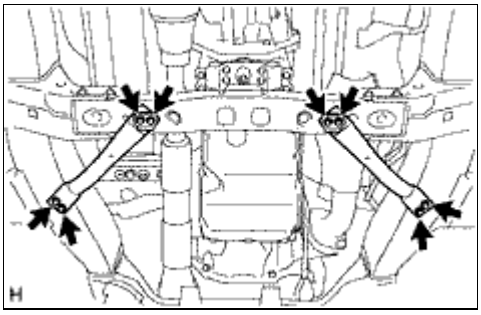
HINT:

Use a container to catch any coolant.

(b) Remove the 2 bolts and disconnect the water by-pass pipe from the automatic transmission assembly.

18. REMOVE FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Remove the 8 bolts, front suspension member bracket LH and front suspension member bracket RH from the No. 3 frame crossmember sub-assembly and vehicle body.

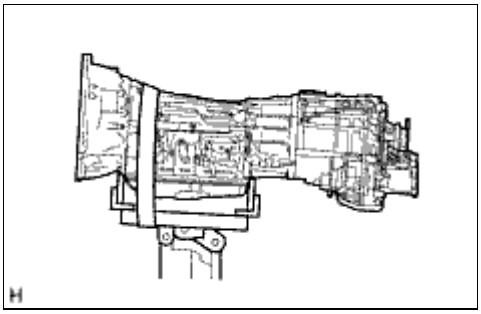


19. SUPPORT AUTOMATIC TRANSMISSION ASSEMBLY

(a) Support the automatic transmission assembly with a transmission jack.

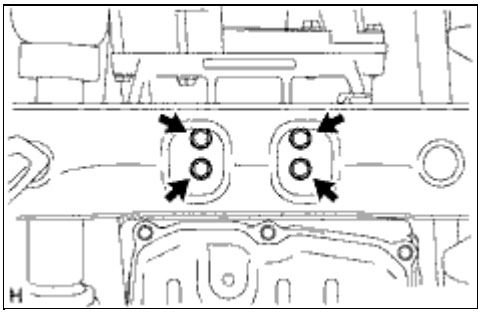
NOTICE:

- In order to protect the automatic transmission oil pan sub-assembly, place attachments on the transmission jack.
- Make sure that the attachments and the automatic transmission oil pan sub-assembly are centered on the transmission jack.
- To prevent the automatic transmission oil pan sub-assembly from deforming, do not place any attachments under the automatic transmission oil pan sub-assembly of the automatic transmission assembly.
- Secure the automatic transmission assembly to the transmission jack using a belt, etc. to prevent it from falling.



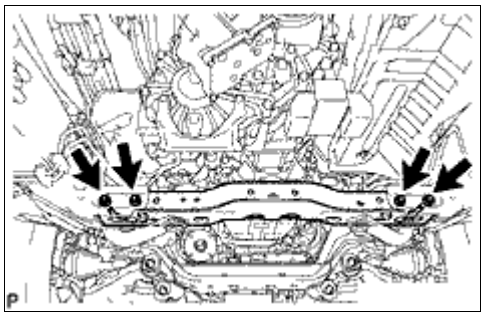
20. REMOVE NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

(a) Remove the 4 bolts and disconnect the No. 3 frame crossmember sub-assembly from the rear engine mounting insulator.



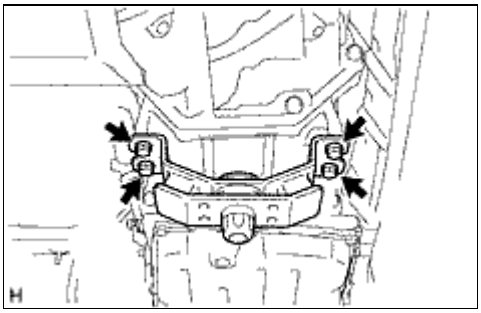
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(b) Remove the 4 bolts, 4 nuts and No. 3 frame crossmember sub-assembly from the vehicle body.



21. REMOVE REAR ENGINE MOUNTING INSULATOR

(a) Remove the 4 bolts and rear engine mounting insulator from the automatic transmission assembly.



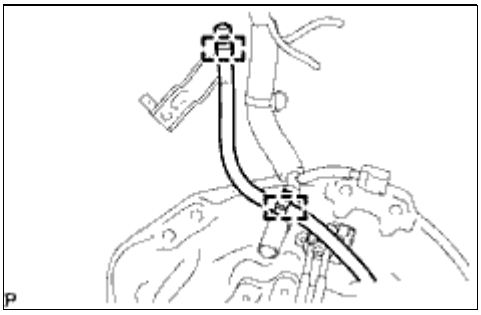
22. DISCONNECT BREATHER PLUG HOSE

(a) Tilt down the automatic transmission assembly.

NOTICE:

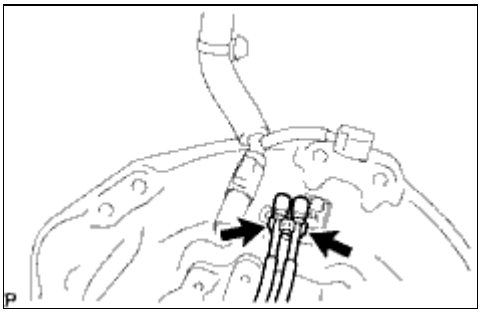
Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Detach the 2 clamps to disconnect the breather plug hose from the transmission breather bracket and wire harness.



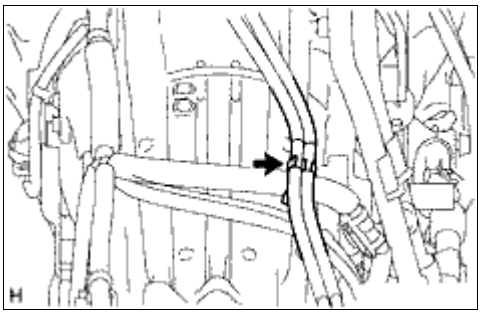
23. DISCONNECT TRANSFER BREATHER HOSE

(a) Detach the 2 clamps to disconnect the 2 transfer breather hoses from the transmission breather bracket.



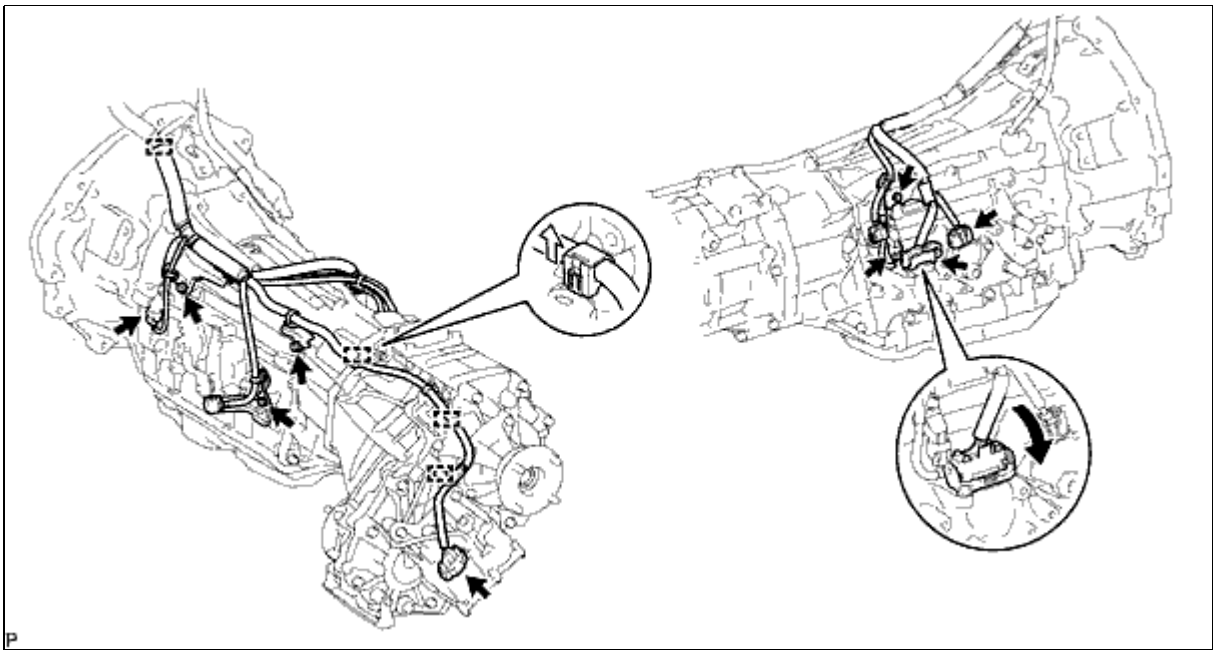
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(b) Detach the 2 clamps to disconnect the 2 transfer breather hoses from the wire harness.



24. DISCONNECT WIRE HARNESS

(a) Disconnect the park/neutral position switch connector, transmission wire connector, 2 transmission revolution sensor connectors and transfer connector.



HINT:

Detach the claw, press down the lever, and then disconnect the transmission wire connector.

(b) Remove the 4 bolts to disconnect the 4 wire harness clamp brackets from the automatic transmission assembly.

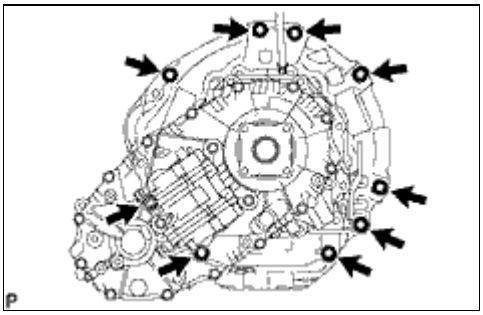
(c) Detach the 4 clamps to disconnect the wire harness from the automatic transmission assembly and transfer assembly.

25. REMOVE AUTOMATIC TRANSMISSION ASSEMBLY

(a) Remove the 9 bolts and automatic transmission assembly from the engine assembly.

NOTICE:

To prevent damage to the 2 knock pins, do not pry between the automatic transmission assembly and engine assembly.



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26. REMOVE FLYWHEEL HOUSING UNDER COVER

(a) Remove the flywheel housing under cover from the engine assembly.

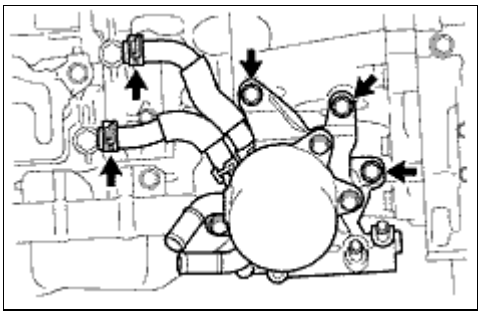
27. REMOVE TRANSFER ASSEMBLY INFO

28. REMOVE TRANSMISSION OIL COOLER ASSEMBLY

HINT:

It is not necessary to remove the transmission oil cooler assembly unless it is being replaced.

(a) Slide the 2 clips and disconnect the 2 oil cooler hoses from the automatic transmission assembly.



HINT:

Use a container to catch any ATF.

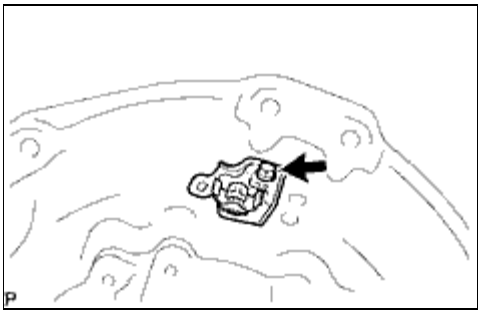
(b) Remove the 3 bolts and transmission oil cooler assembly with transmission oil thermostat from the automatic transmission assembly.

29. REMOVE TRANSMISSION BREATHER BRACKET

HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

(a) Remove the bolt and transmission breather bracket from the automatic transmission assembly.

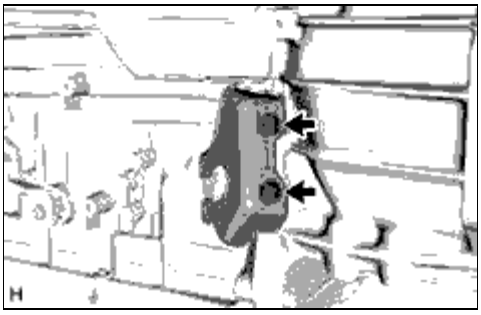


30. REMOVE TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

(a) Remove the 2 bolts and transmission control cable bracket from the automatic transmission assembly.



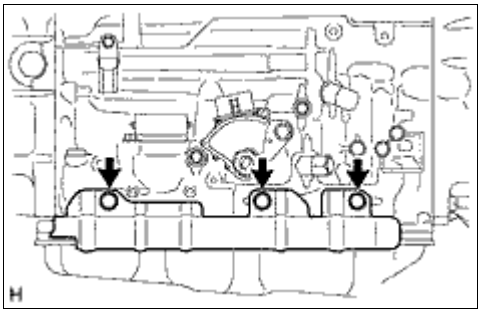
31. REMOVE TRANSMISSION OIL PAN HEAT INSULATOR

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HINT:

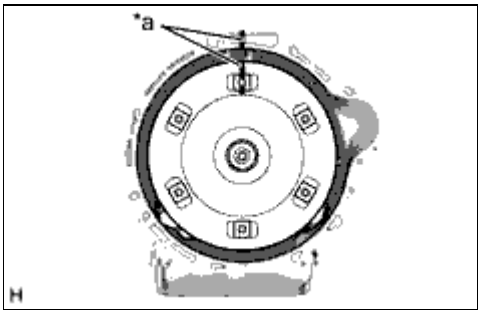
It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

(a) Remove the 3 bolts and transmission oil pan heat insulator from the automatic transmission assembly.



32. REMOVE TORQUE CONVERTER ASSEMBLY

(a) Put matchmarks on the automatic transmission assembly and torque converter assembly.



Text in Illustration

*a	Matchmark

(b) Remove the torque converter assembly from the automatic transmission assembly.

NOTICE:

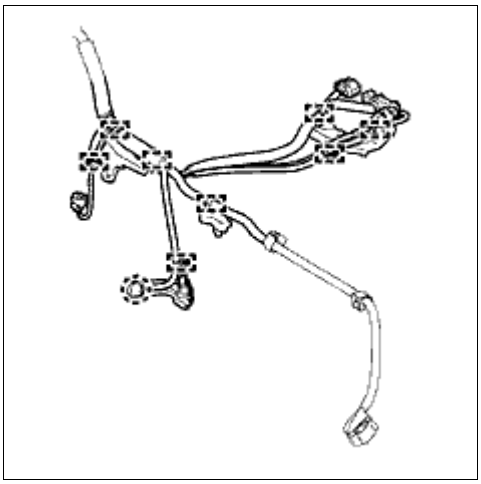
Remove the torque converter assembly from the input shaft horizontally.

33. REMOVE WIRE HARNESS CLAMP BRACKET

HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.

(a) Detach the 8 clamps and claw to remove the 4 wire harness clamp brackets from the wire harness.



34. INSPECT TORQUE CONVERTER ASSEMBLY INFO

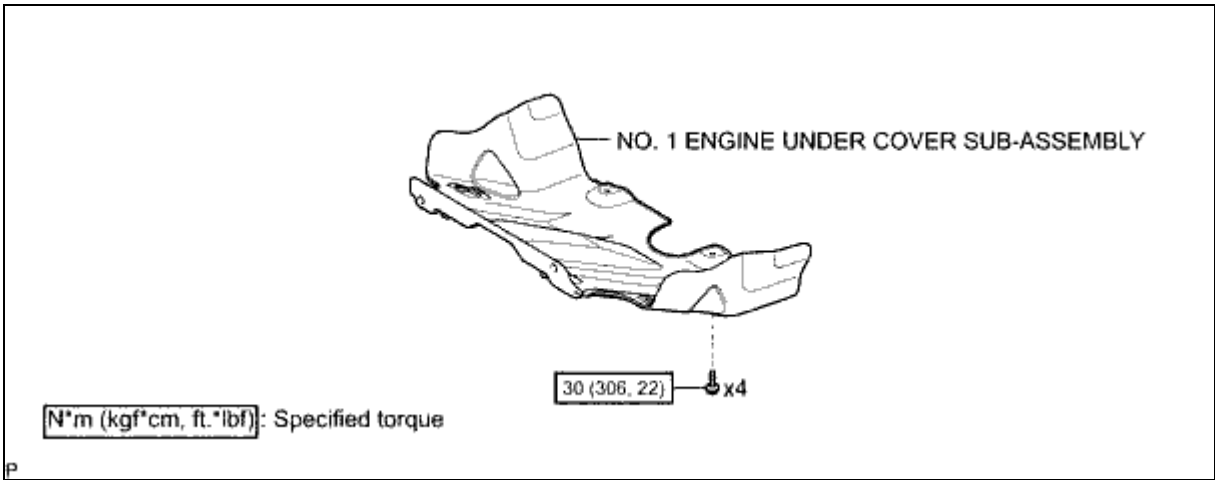
35. INSPECT DRIVE PLATE AND RING GEAR SUB-ASSEMBLY INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005LYC005X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2TR-FE): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

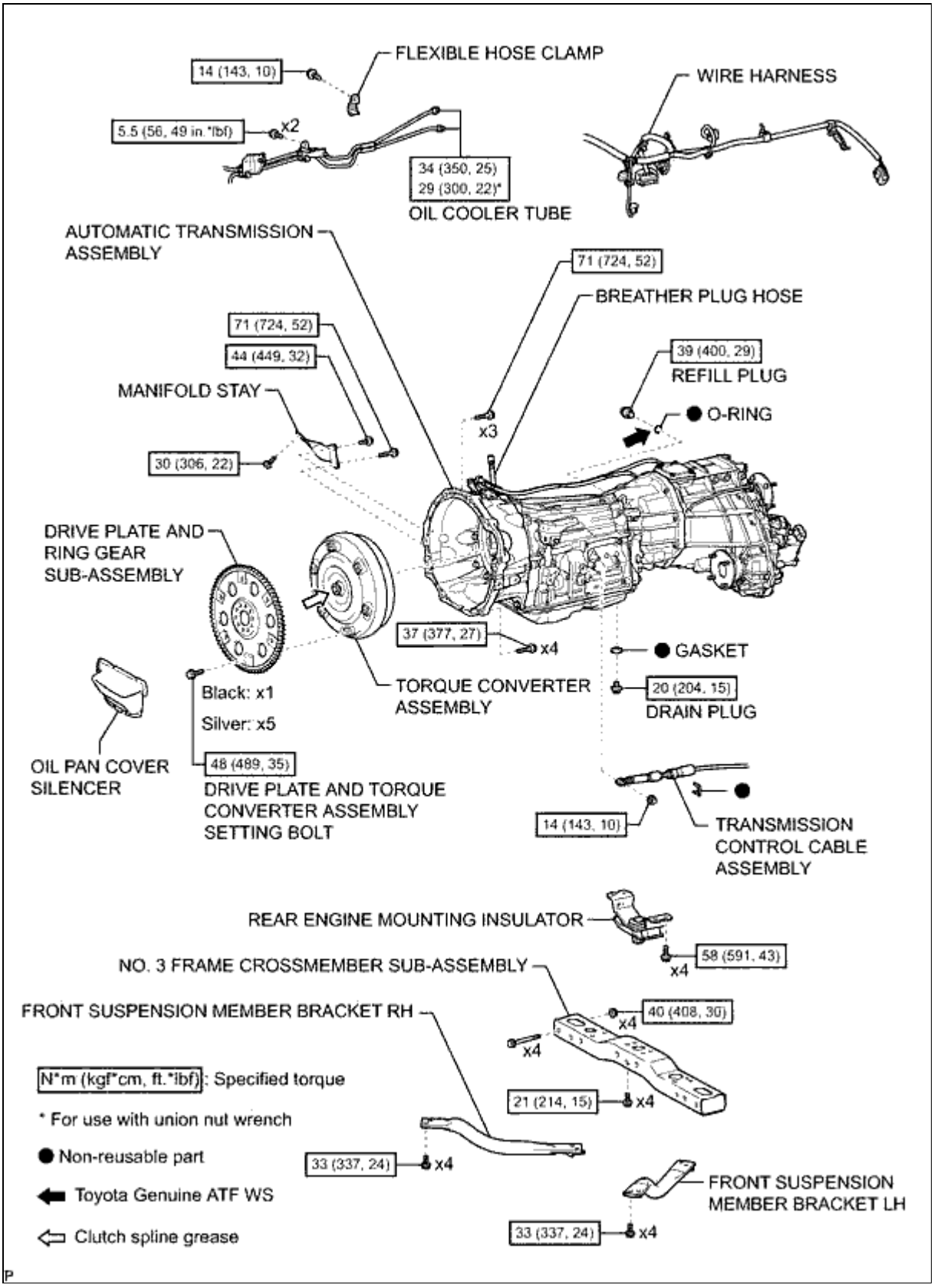
COMPONENTS

ILLUSTRATION



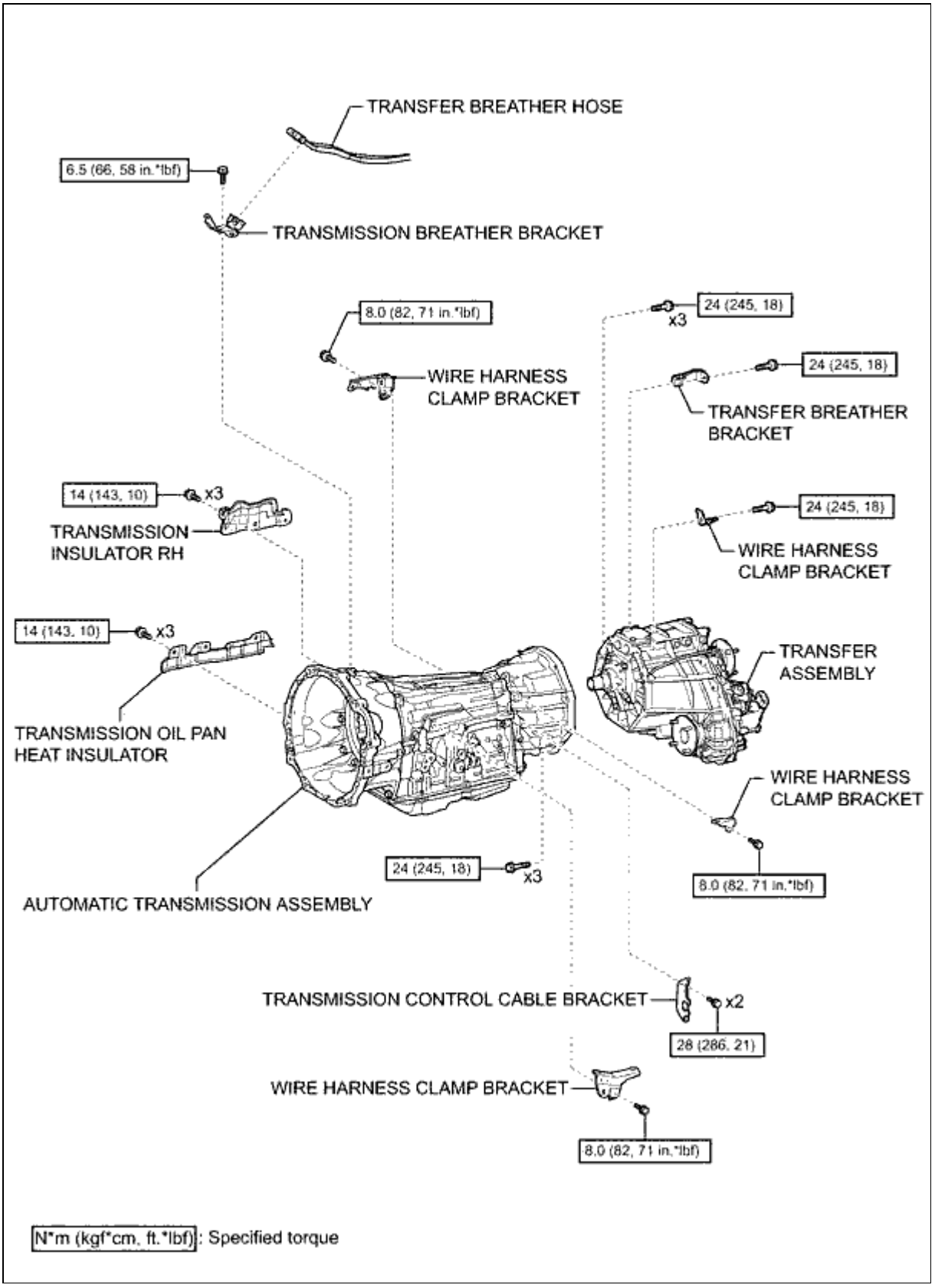
ILLUSTRATION

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000NR805DX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2TR-FE): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL WIRE HARNESS CLAMP BRACKET

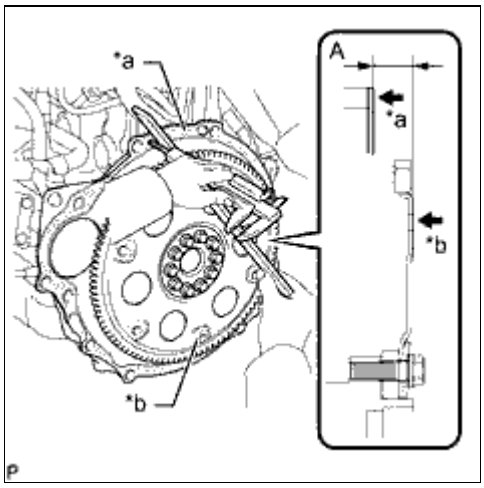
HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.

(a) Attach the 7 clamps to install the 3 wire harness clamp brackets to the wire harness.

2. INSTALL TORQUE CONVERTER ASSEMBLY

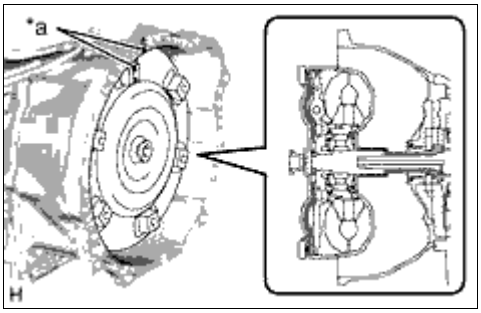
(a) Using a vernier caliper and straightedge, measure the dimension (A) between the automatic transmission assembly contact surface of the engine assembly (*a) and the torque converter assembly contact surface of the drive plate (*b).



Text in Illustration

*a	Engine Surface
*b	Drive Plate Surface

(b) Align the matchmark on the automatic transmission case sub-assembly with the one on the torque converter assembly and engage the splines of the input shaft with the turbine runner splines.



Text in Illustration

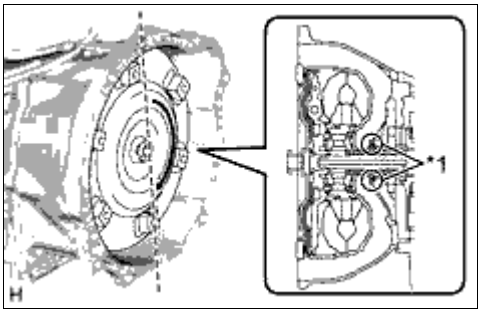
*a	Matchmark

NOTICE:

Install the torque converter assembly to the input shaft while keeping it horizontal.

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(c) Rotate the torque converter assembly approximately 180° and engage the splines of the stator shaft with the stator assembly.



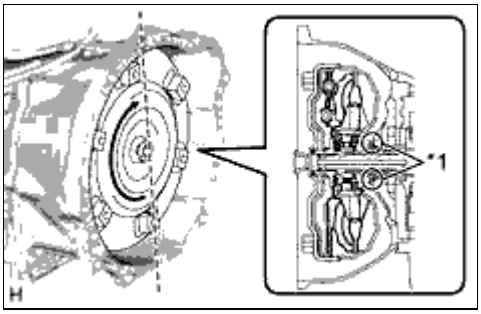
Text in Illustration

*1	Front Oil Pump Oil Seal

NOTICE:

- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(d) Rotate the torque converter assembly approximately 180° again, align the matchmark on the torque converter assembly with the one on the automatic transmission case sub-assembly and insert the key of the torque converter assembly into the groove of the oil pump drive gear.



Text in Illustration

*1	Front Oil Pump Oil Seal

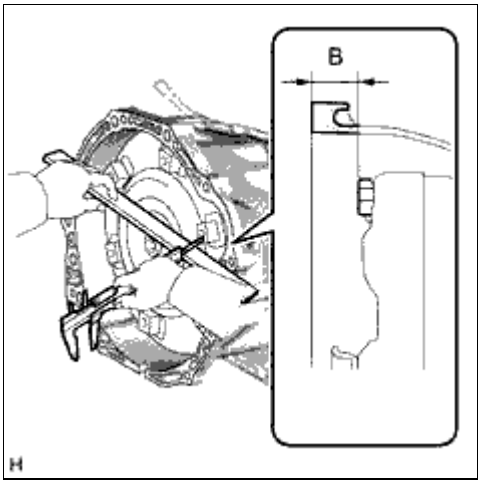
NOTICE:

- Do not push the torque converter assembly excessively when rotating it.
- Do not damage the front oil pump oil seal.
- Install the torque converter assembly to the input shaft while keeping it horizontal.

(e) Using a vernier caliper and straightedge, measure the dimension (B) shown in the illustration and check that the dimension (B) is more than the dimension (A), which was measured in the previous step.

Standard:

B = A + 1 mm (0.0394 in.) or more



NOTICE:

- Make sure to deduct the thickness of the straightedge.
- If the automatic transmission assembly is installed to the engine assembly with the torque converter assembly not sufficiently inserted, the torque converter assembly may be damaged.

3. INSTALL TRANSMISSION OIL PAN HEAT INSULATOR

HINT:

It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

(a) Install the transmission oil pan heat insulator to the automatic transmission assembly with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

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4. INSTALL TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

(a) Install the transmission control cable bracket to the automatic transmission assembly with the 2 bolts.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

5. INSTALL TRANSMISSION BREATHER BRACKET

HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

(a) Install the transmission breather bracket to the automatic transmission assembly with the bolt.

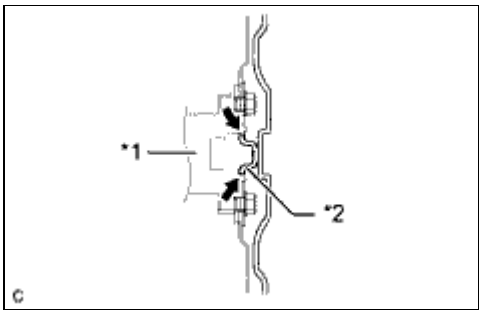
Torque:

6.5 N·m {66 kgf·cm, 58in·lbf}

6. INSTALL TRANSFER ASSEMBLY INFO

7. INSTALL AUTOMATIC TRANSMISSION ASSEMBLY

(a) Apply clutch spline grease to the circumference of the crankshaft that contacts the torque converter assembly centerpiece.



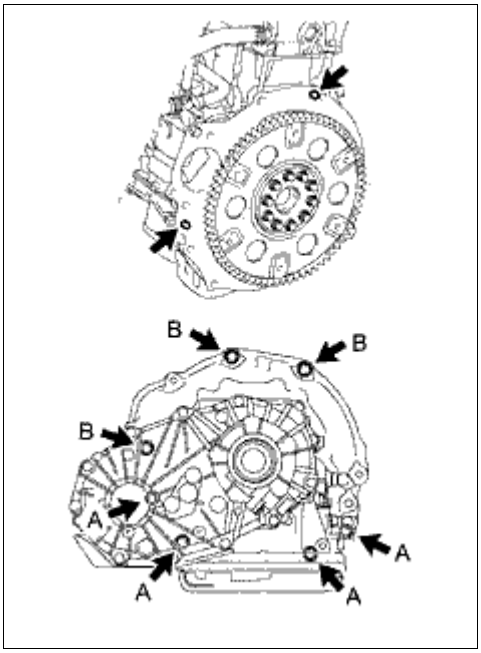
Text in Illustration

*1	Crankshaft
*2	Torque Converter Assembly Centerpiece
➡	Clutch Spline Grease

Clutch spline grease:
Toyota Genuine Clutch Spline Grease or equivalent
Maximum grease amount:
Approximately 1 g (0.0353 oz.)

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(b) Confirm that the 2 knock pins are installed on the engine assembly and are not damaged.



(c) While keeping the engine assembly and automatic transmission assembly horizontal, align the 2 knock pins with the holes in the automatic transmission assembly and install the 7 bolts.

Torque:

for Bolt A -

37 N·m {377 kgf·cm, 27ft·lbf}

for Bolt B -

71 N·m {724 kgf·cm, 52ft·lbf}

NOTICE:

- Do not use excessive force when installing the automatic transmission assembly.
- Check that the torque converter assembly rotates.
- Make sure that the wire harness or other similar items are not pinched between the contact surfaces.
- Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

8. CONNECT WIRE HARNESS

(a) Tilt down the automatic transmission assembly.

NOTICE:

Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Attach the 6 clamps to connect the wire harness to the automatic transmission assembly and transfer assembly.

(c) Connect the 3 wire harness clamp brackets to the automatic transmission assembly with the 3 bolts.

Torque:

8.0 N·m {82 kgf·cm, 71in·lbf}

(d) Connect the park/neutral position switch connector, transmission wire connector, 2 transmission revolution sensor connectors and transfer connector.

HINT:

Push up the lever until the claw of the transmission wire connector makes a connection sound.

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9. CONNECT TRANSFER BREATHER HOSE

(a) Attach the 2 clamps to connect the 2 transfer breather hoses to the wire harness.

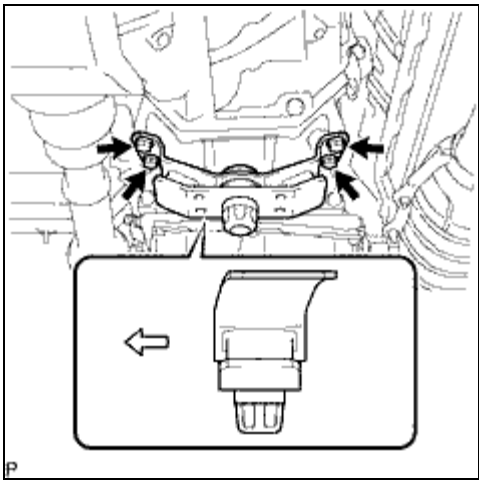
(b) Attach the 2 clamps to connect the 2 transfer breather hoses to the transmission breather bracket.

10. CONNECT BREATHER PLUG HOSE

(a) Attach the 2 clamps to connect the breather plug hose to the transmission breather bracket and wire harness.

11. INSTALL REAR ENGINE MOUNTING INSULATOR

(a) Install the rear engine mounting insulator to the automatic transmission assembly with the 4 bolts as shown in the illustration.



Text in Illustration

⇨	Front Side

Torque:

58 N·m {591 kgf·cm, 43ft·lbf}

12. INSTALL NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

(a) Install the No. 3 frame crossmember sub-assembly to the vehicle body with the 4 bolts and 4 nuts.

Torque:

40 N·m {408 kgf·cm, 30ft·lbf}

NOTICE:

Install the nuts so that they face the rear of the vehicle.

HINT:

Hold the bolts while tightening the nuts.

(b) Connect the No. 3 frame crossmember sub-assembly to the rear engine mounting insulator with the 4 bolts.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

13. INSTALL FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Install the front suspension member bracket LH and front suspension member bracket RH to the No. 3

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frame crossmember sub-assembly and vehicle body with the 8 bolts.

Torque:

33 N·m {337 kgf·cm, 24ft·lbf}

14. CONNECT OIL COOLER TUBE

(a) Connect the ends of the 2 oil cooler tubes to the automatic transmission assembly by hand.

(b) Connect the 2 oil cooler tubes to the engine assembly with the 2 bolts.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(c) Install the flexible hose clamp to the automatic transmission assembly with the bolt.

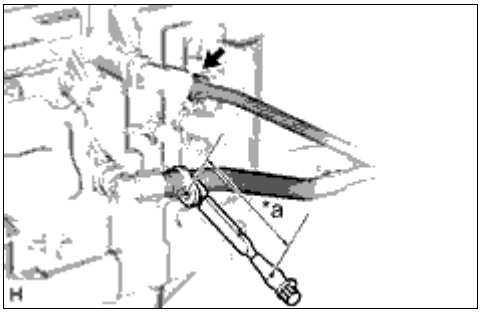
Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(d) Using a 17 mm union nut wrench, tighten the 2 oil cooler tubes.

Text in Illustration

*a	Torque Wrench Fulcrum Length



Torque:

Specified tightening torque -

34 N·m {350 kgf·cm, 25ft·lbf}

HINT:

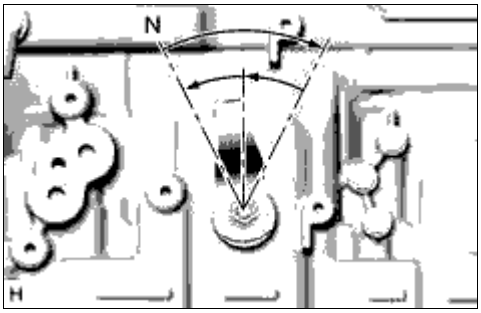
- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using a union nut wrench (fulcrum length of 30 mm (1.18 in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 29 N*m (300 kgf*cm, 22 ft.*lbf)

15. INSTALL TRANSMISSION INSULATOR RH INFO

16. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Move the shift lever to N.

(b) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(c) Connect the transmission control cable assembly to the transmission control shaft lever LH with the nut.

Torque:

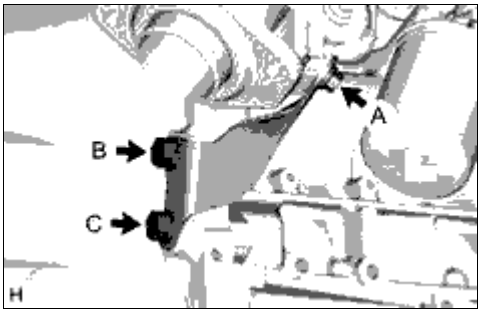
14 N·m {143 kgf·cm, 10ft·lbf}

(d) Connect the transmission control cable assembly to the transmission control cable bracket with a new clip.

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17. INSTALL MANIFOLD STAY

(a) Install the manifold stay to the automatic transmission assembly and exhaust manifold with the 3 bolts.



Torque:

for Bolt A -

30 N·m {306 kgf·cm, 22ft·lbf}

for Bolt B -

44 N·m {449 kgf·cm, 32ft·lbf}

for Bolt C -

71 N·m {724 kgf·cm, 52ft·lbf}

18. INSTALL DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

(a) Turn the crankshaft to gain access to the installation locations of the 6 drive plate and torque converter assembly setting bolts and install each bolt while holding the crankshaft pulley bolt with a wrench.

Torque:

48 N·m {489 kgf·cm, 35ft·lbf}

NOTICE:

Install the black colored bolt first, and then the 5 silver colored bolts.

19. INSTALL OIL PAN COVER SILENCER

(a) Install the oil pan cover silencer to the engine assembly.

20. INSTALL STARTER ASSEMBLY

INFO

21. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

22. INSTALL FRONT PROPELLER SHAFT ASSEMBLY

INFO

23. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

24. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

25. ADD TRANSFER OIL INFO

26. ADD AUTOMATIC TRANSMISSION FLUID

INFO

27. INSPECT SHIFT LEVER POSITION INFO

28. INSPECT FOR OIL LEAK

(a) Start the engine. Make sure that there are no oil leaks from the areas that were worked on.

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29. INSPECT FOR EXHAUST GAS LEAK INFO

30. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

31. RESET MEMORY

INFO

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000NRA05BX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION ASSEMBLY (for 2TR-FE): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

CAUTION:

The automatic transmission assembly is very heavy. Be sure to follow the procedure described in the repair manual, or the transmission jack may suddenly drop.

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative (-) battery terminal notices before proceeding with work INFO .

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

3. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

4. DRAIN TRANSFER OIL INFO

5. DRAIN AUTOMATIC TRANSMISSION FLUID INFO

6. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

7. REMOVE FRONT PROPELLER SHAFT ASSEMBLY

INFO

8. REMOVE FRONT EXHAUST PIPE ASSEMBLY

INFO

9. REMOVE STARTER ASSEMBLY

INFO

10. REMOVE OIL PAN COVER SILENCER

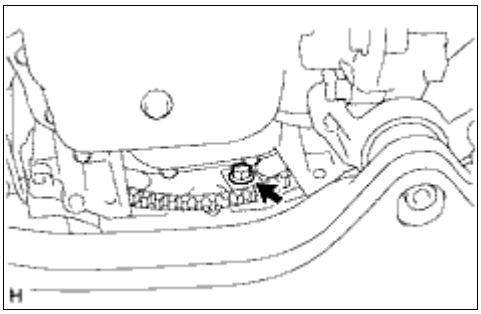
(a) Remove the oil pan cover silencer from the engine assembly.



11. REMOVE DRIVE PLATE AND TORQUE CONVERTER ASSEMBLY SETTING BOLT

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(a) Turn the crankshaft to gain access to the removable locations of the 6 drive plate and torque converter assembly setting bolts and remove each bolt while holding the crankshaft pulley bolt with a wrench.

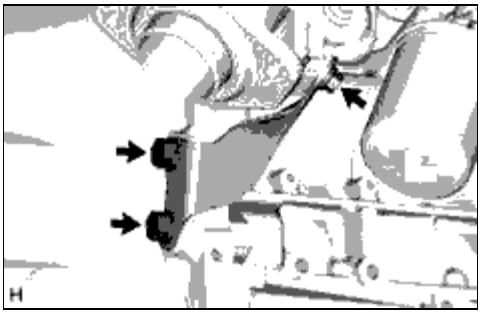


HINT:

There will be one black colored bolt.

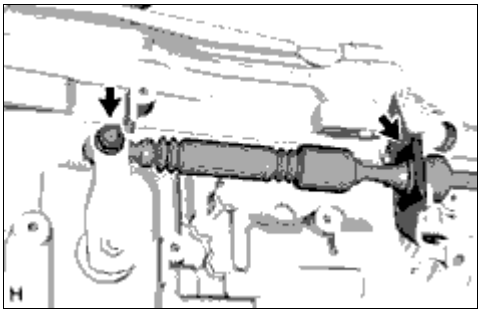
12. REMOVE MANIFOLD STAY

(a) Remove the 3 bolts and manifold stay from the automatic transmission assembly and exhaust manifold.



13. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

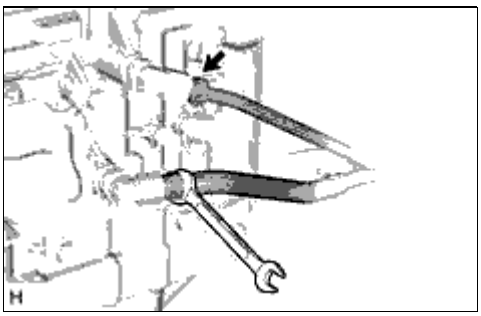
(a) Remove the clip and nut and disconnect the transmission control cable assembly from the transmission control shaft lever LH and transmission control cable bracket.



14. REMOVE TRANSMISSION INSULATOR RH INFO

15. DISCONNECT OIL COOLER TUBE

(a) Disconnect the 2 oil cooler tubes from the automatic transmission assembly.

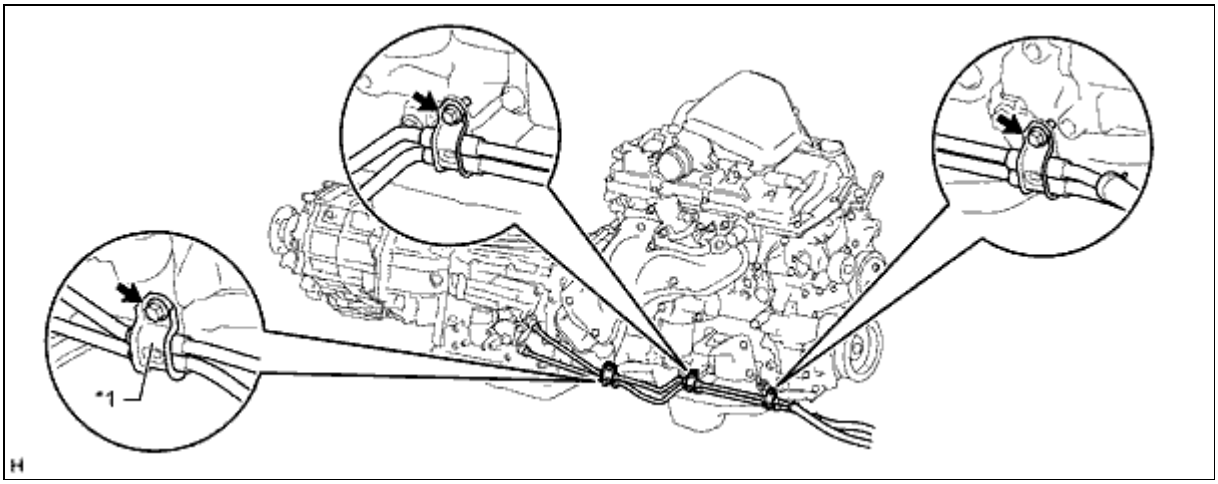


HINT:

Use a container to catch any ATF.

(b) Remove the bolt and flexible hose clamp from the automatic transmission assembly.

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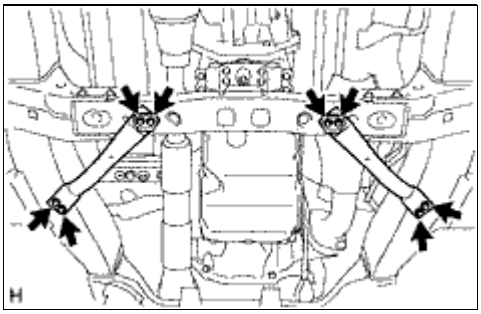
Text in Illustration

*1	Flexible Hose Clamp	-	-

(c) Remove the 2 bolts and disconnect the 2 oil cooler tubes from the engine assembly.

16. REMOVE FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Remove the 8 bolts, front suspension member bracket LH and front suspension member bracket RH from the No. 3 frame crossmember sub-assembly and vehicle body.

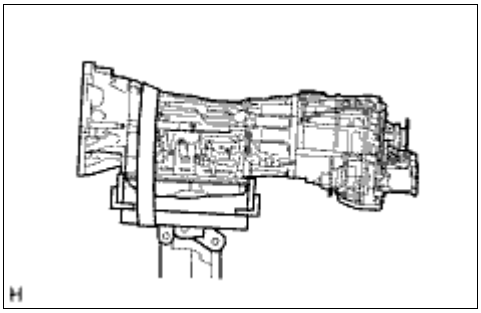


17. SUPPORT AUTOMATIC TRANSMISSION ASSEMBLY

(a) Support the automatic transmission assembly with a transmission jack.

NOTICE:

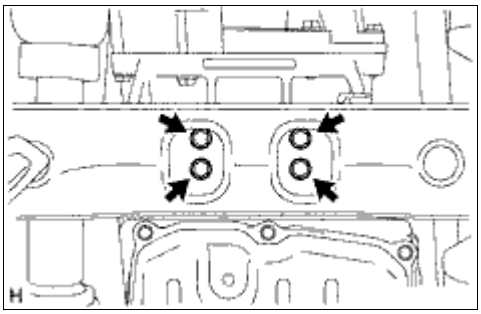
- In order to protect the automatic transmission oil pan sub-assembly, place attachments on the transmission jack.
- Make sure that the attachments and the automatic transmission oil pan sub-assembly are centered on the transmission jack.
- To prevent the automatic transmission oil pan sub-assembly from deforming, do not place any attachments under the automatic transmission oil pan sub-assembly of the automatic transmission assembly.
- Secure the automatic transmission assembly to the transmission jack using a belt, etc. to prevent it from falling.



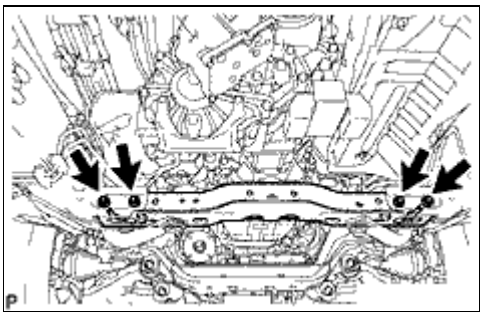
18. REMOVE NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

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(a) Remove the 4 bolts and disconnect the No. 3 frame crossmember sub-assembly from the rear engine mounting insulator.

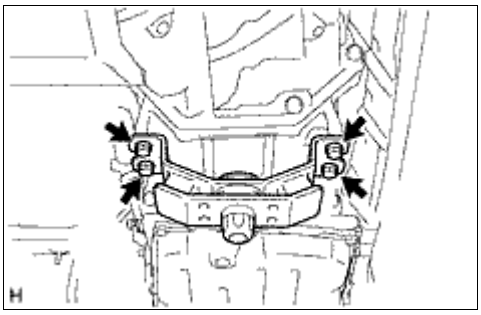


(b) Remove the 4 bolts, 4 nuts and No. 3 frame crossmember sub-assembly from the vehicle body.



19. REMOVE REAR ENGINE MOUNTING INSULATOR

(a) Remove the 4 bolts and rear engine mounting insulator from the automatic transmission assembly.



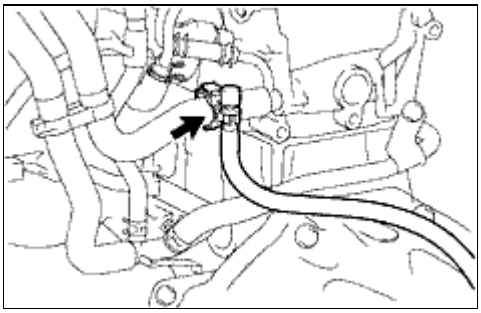
20. DISCONNECT BREATHER PLUG HOSE

(a) Tilt down the automatic transmission assembly.

NOTICE:

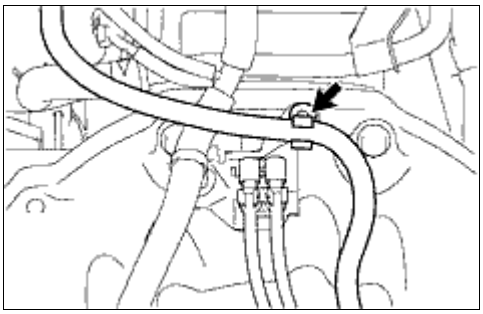
Make sure that the cooling fan and fan shroud do not contact the engine assembly when tilting the automatic transmission assembly.

(b) Detach the clamp to disconnect the breather plug hose from the engine assembly.



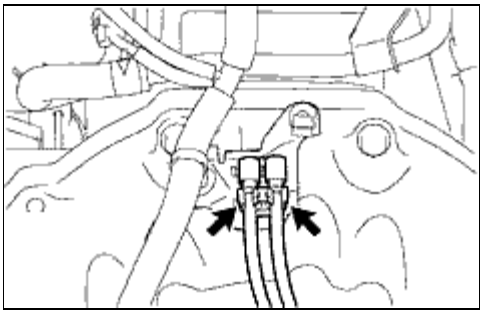
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(c) Detach the clamp to disconnect the breather plug hose from the transmission breather bracket.

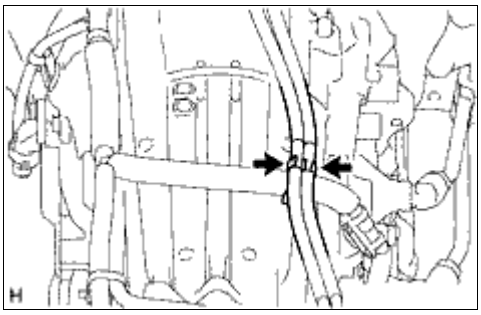


21. DISCONNECT TRANSFER BREATHER HOSE

(a) Detach the 2 clamps to disconnect the 2 transfer breather hoses from the transmission breather bracket.



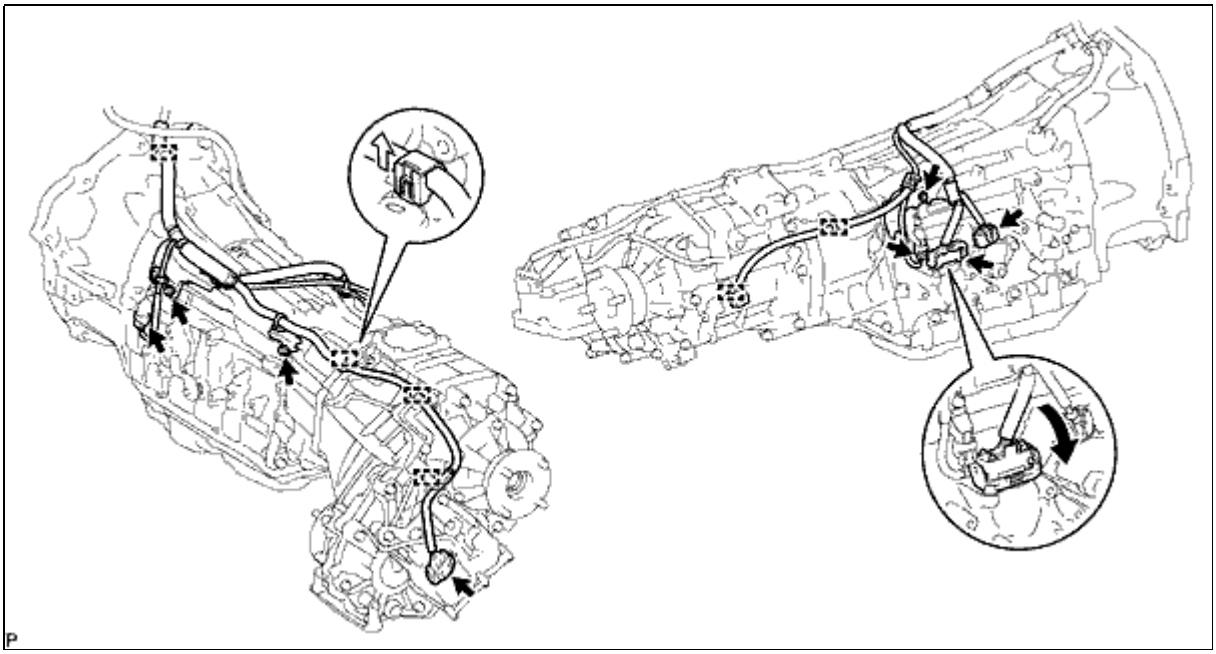
(b) Detach the 2 clamps to disconnect the 2 transfer breather hoses from the wire harness.



22. DISCONNECT WIRE HARNESS

(a) Disconnect the park/neutral position switch connector, transmission wire connector, 2 transmission revolution sensor connectors and transfer connector.

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HINT:

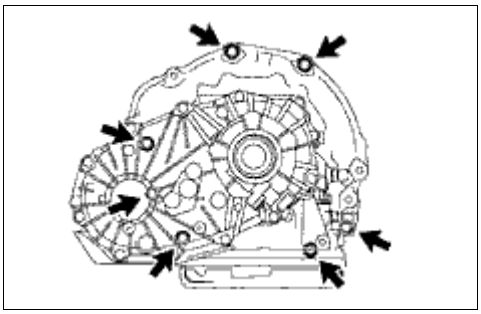
Detach the claw, press down the lever, and then disconnect the transmission wire connector.

(b) Remove the 3 bolts to disconnect the 3 wire harness clamp brackets from the automatic transmission assembly.

(c) Detach the 6 clamps to disconnect the wire harness from the automatic transmission assembly and transfer assembly.

23. REMOVE AUTOMATIC TRANSMISSION ASSEMBLY

(a) Remove the 7 bolts and automatic transmission assembly from the engine assembly.



NOTICE:

To prevent damage to the 2 knock pins, do not pry between the automatic transmission assembly and engine assembly.

24. REMOVE TRANSFER ASSEMBLY INFO

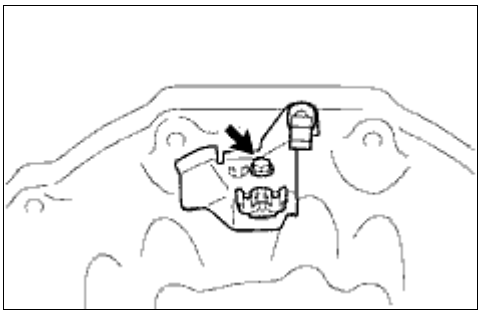
25. REMOVE TRANSMISSION BREATHER BRACKET

HINT:

It is not necessary to remove the transmission breather bracket unless it is being replaced.

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(a) Remove the bolt and disconnect the transmission breather bracket from the automatic transmission assembly.

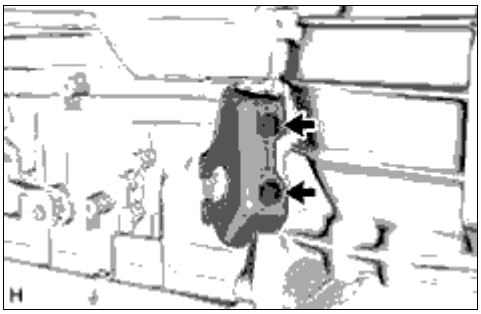


26. REMOVE TRANSMISSION CONTROL CABLE BRACKET

HINT:

It is not necessary to remove the transmission control cable bracket unless it is being replaced.

(a) Remove the 2 bolts and transmission control cable bracket from the automatic transmission assembly.

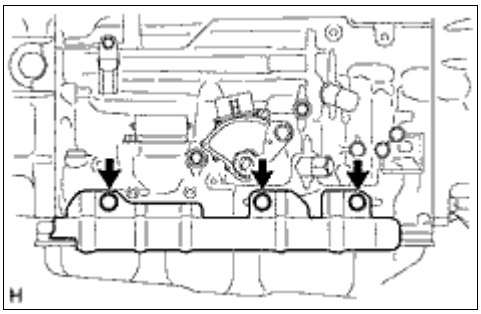


27. REMOVE TRANSMISSION OIL PAN HEAT INSULATOR

HINT:

It is not necessary to remove the transmission oil pan heat insulator unless it is being replaced.

(a) Remove the 3 bolts and transmission oil pan heat insulator from the automatic transmission assembly.

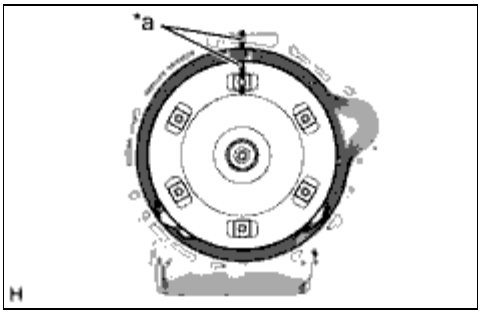


28. REMOVE TORQUE CONVERTER ASSEMBLY

(a) Put matchmarks on the automatic transmission assembly and the torque converter assembly.

Text in Illustration

*a	Matchmark



(b) Remove the torque converter assembly from the automatic transmission assembly.

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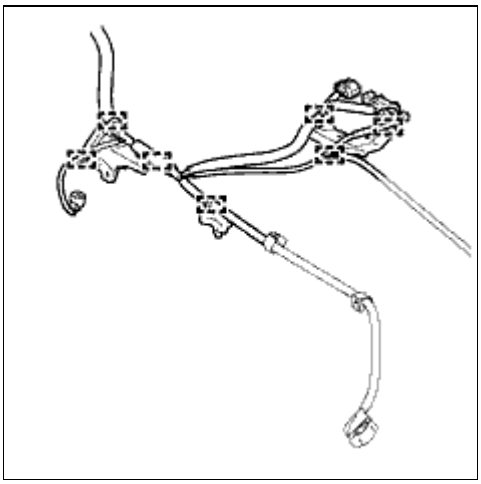
NOTICE:

Remove the torque converter assembly from the input shaft horizontally.

29. REMOVE WIRE HARNESS CLAMP BRACKET

HINT:

It is not necessary to remove the wire harness clamp brackets unless they are being replaced.



(a) Detach the 7 clamps to remove the 3 wire harness clamp brackets from the wire harness.

30. INSPECT TORQUE CONVERTER ASSEMBLY INFO

31. INSPECT DRIVE PLATE AND RING GEAR SUB-ASSEMBLY INFO

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Last Modified: 2-12-2016	6.6 N	**Doc ID:** RM0000013BU0DNX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION FLUID: ADJUSTMENT; 2016 MY Tacoma [08/2015 -]		

ADJUSTMENT

1. BEFORE FILLING TRANSMISSION

- The AC60F automatic transmission assembly requires Toyota Genuine ATF WS.
- If the entire automatic transmission assembly, automatic transmission oil pan sub-assembly, drain plug, transmission valve body assembly and/or torque converter assembly have/has been replaced, proceed to the Fill Transmission procedure.
- If the transfer adapter oil seal has been replaced and/or an automatic transmission fluid leak has been repaired, proceed to the Adjust Fluid Temperature procedure.

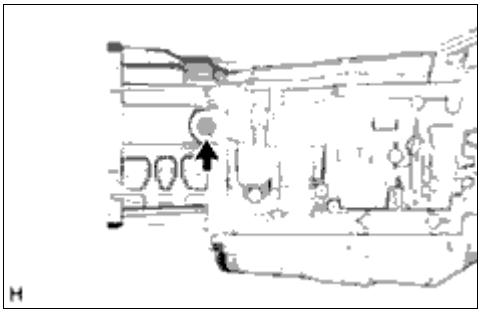
2. FILL TRANSMISSION PAN WITH FLUID

(a) Lift the vehicle.

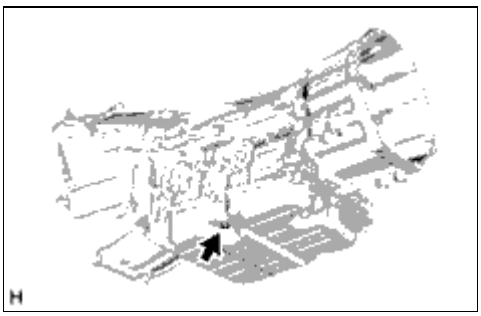
NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within +/-1°).

(b) Remove the refill plug and O-ring from the automatic transmission assembly.

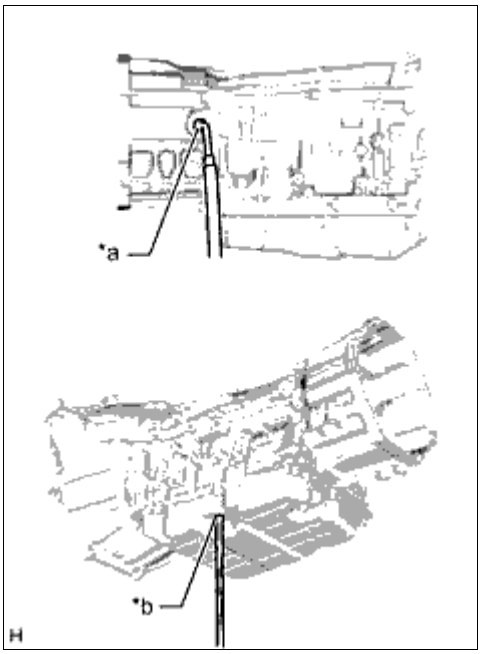


(c) Using a 5 mm hexagon socket wrench, remove the overflow plug and gasket from the automatic transmission assembly.



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(d) Add automatic transmission fluid to the refill hole until it flows out of the overflow hole.



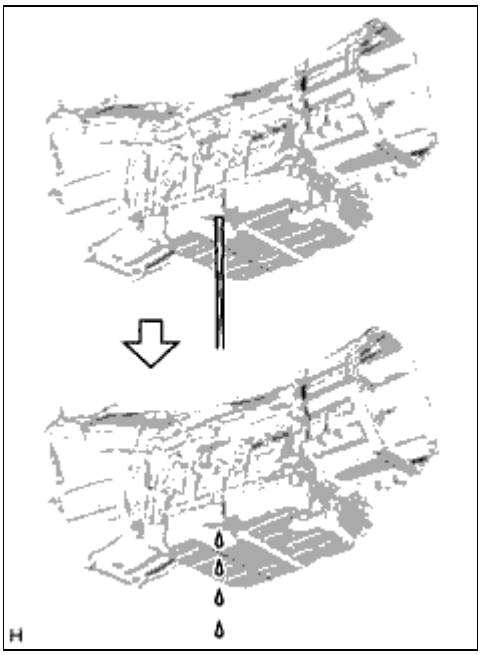
Text in Illustration

*a	Refill Hole
*b	Overflow Hole

NOTICE:

- Use Toyota Genuine ATF WS.
- Be sure to add automatic transmission fluid slowly. If automatic transmission fluid is added quickly, the automatic transmission fluid may hit internal parts and bounce back, resulting in automatic transmission fluid coming out of the refill hole.

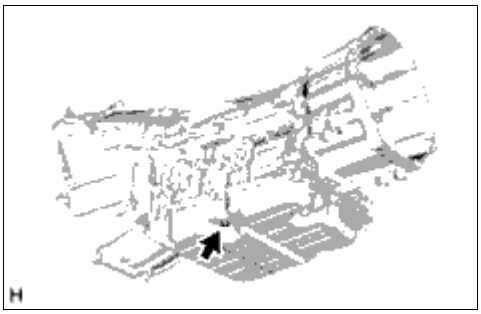
(e) Wait until the automatic transmission fluid flow slows and only drips come out.



(f) Using a 5 mm hexagon socket wrench, temporarily install the overflow plug and gasket to the automatic transmission assembly.

HINT:

Reuse the old gasket as the overflow plug will be removed again.



3. FILL TRANSMISSION

(a) Fill the transmission with the correct amount of fluid as listed in the table below.

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Standard Capacity:

PERFORMED REPAIR	ENGINE TYPE	FILL AMOUNT
Automatic transmission fluid drain and refill	2GR-FKS	3.1 liters (3.3 US qts, 2.7 Imp. qts)
	2TR-FE	1.5 liters (1.6 US qts, 1.3 Imp. qts)
Removal and installation of the automatic transmission oil pan sub-assembly	2GR-FKS	2.4 liters (2.5 US qts, 2.1 Imp. qts)
	2TR-FE	0.8 liters (0.8 US qts, 0.7 Imp. qts)
Removal and installation of the transmission valve body assembly	2GR-FKS	3.1 liters (3.3 US qts, 2.7 Imp. qts)
	2TR-FE	1.6 liters (1.7 US qts, 1.4 Imp. qts)
Removal and installation of the torque converter assembly (Including the oil drain)	2GR-FKS	4.2 liters (4.4 US qts, 3.7 Imp. qts)
	2TR-FE	2.4 liters (2.5 US qts, 2.1 Imp. qts)

HINT:

If the specified amount of automatic transmission fluid cannot be added, perform the following:

(1) Temporarily install the O-ring and refill plug to the automatic transmission assembly.

HINT:

Reuse the old O-ring as the refill plug will be removed again.

(2) Lower the vehicle.

(3) Start the engine.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

(4) Slowly move the shift lever from P to S, then move the shift lever to P.

(5) Allow the engine to idle for 30 seconds to warm it up.

(6) Turn the ignition switch off.

(7) Remove the refill plug and O-ring from the automatic transmission assembly.

(8) Fill the automatic transmission assembly with the correct amount of automatic transmission fluid as listed in the table above.

(9) Temporarily install the O-ring and refill plug to the automatic transmission assembly.

HINT:

Reuse the old O-ring as the refill plug will be removed again.

4. CHECK FLUID TEMPERATURE

NOTICE:

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The automatic transmission fluid temperature can be confirmed by checking the D shift indicator on the combination meter or using the Techstream. When not using the Techstream, it is necessary to enter automatic transmission fluid temperature detection mode.

(a) When using the Techstream:

HINT:

The actual ATF temperature can be checked on the Data List using the Techstream.

(1) Connect the Techstream to the DLC3 with the ignition switch off.

(2) Turn the ignition switch to ON and turn the Techstream on.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system are off.

(3) for 2GR-FKS:

Enter the following menus: Powertrain / Transmission / Active Test / Connect the TC and TE1.

(4) for 2TR-FE:

Enter the following menus: Powertrain / Engine and ECT / Active Test / Connect the TC and TE1.

(5) Select the Active Test item: Connect the TC and TE1 / ON.

(6) Select the Data List menu: A/T Oil Temperature 1.

(7) Check the ATF temperature.

NOTICE:

- If the fluid temperature is below 45°C (113°F), proceed to the next step. (Recommended ATF temperature: 35°C (95°F) or less)
- If the fluid temperature is 45°C (113°F) or more, turn the ignition switch off and wait until the fluid temperature drops below 45°C (113°F).

(8) Depress and hold the brake pedal.

(9) Start the engine.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

(10) Slowly move the shift lever from P to S, then move the shift lever to P.

HINT:

Slowly move the shift lever to circulate the automatic transmission fluid through each part of the automatic transmission assembly.

(11) While observing the D shift indicator on the combination meter, move the shift lever back and forth between N and D at an interval of less than 1.5 seconds for 6 seconds or more.

NOTICE:

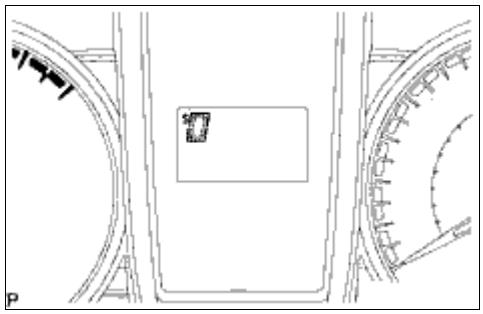
Do not pause for more than 1.5 seconds.

HINT:

Performing this operation will cause the vehicle to enter automatic transmission fluid temperature detection mode.

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(12) Check that the D shift indicator comes on for 2 seconds.



HINT:

- When fluid temperature detection mode is activated, the D shift indicator on the combination meter comes on for 2 seconds.
- If the D shift indicator does not come on for 2 seconds, return to the first step and perform the procedure again.

(13) Move the shift lever from N to P.

(14) Release the brake pedal.

(15) Select the Active Test item: Connect the TC and TE1 / OFF.

NOTICE:

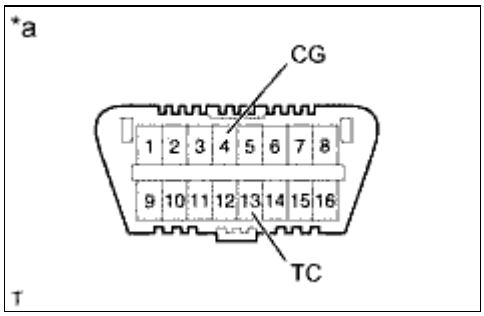
Be sure that terminals TC and TE1 are not connected. If the terminals are connected, the fluid level cannot be precisely adjusted due to fluctuations in engine speed.

HINT:

- Disconnecting terminals TC and TE1 activates engine idle speed control mode.
- Even after terminals TC and TE1 are disconnected, automatic transmission fluid temperature detection mode will be active until the ignition switch is turned off.

(b) When not using the Techstream:

(1) Connect terminals CG (4) and TC (13) of the DLC3 using SST.



Text in Illustration

*a	DLC3

SST: 09843-18040

(2) Depress and hold the brake pedal.

(3) Start the engine.

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fans and audio system, are off.

HINT:

The indicator lights on the combination meter blink to indicate DTCs when terminals TC and CG are connected.

(4) Slowly move the shift lever from P to S, then move the shift lever to P.

HINT:

Slowly move the shift lever to circulate the automatic transmission fluid through each part of the automatic transmission assembly.

(5) While observing the D shift indicator on the combination meter, move the shift lever back and forth between N and D at an interval of less than 1.5 seconds for 6 seconds or more.

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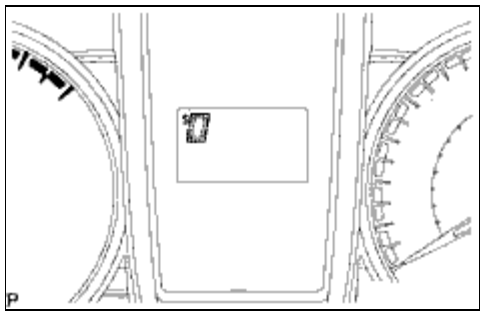
NOTICE:

Do not pause for more than 1.5 seconds.

HINT:

Performing this operation will cause the vehicle to enter automatic transmission fluid temperature detection mode.

(6) Check that the D shift indicator comes on for 2 seconds.



HINT:

- When fluid temperature detection mode is activated, the D shift indicator on the combination meter comes on for 2 seconds.
- If the D shift indicator does not come on for 2 seconds, return to the first step and perform the procedure again.

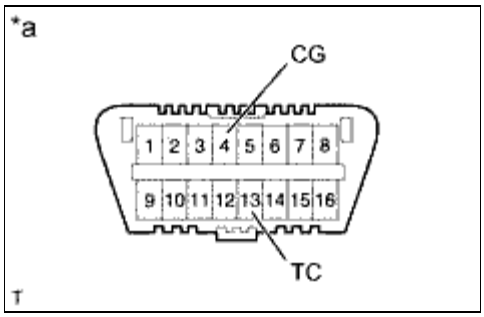
(7) Move the shift lever from N to P.

(8) Release the brake pedal.

(9) Remove SST from terminals 13 (TC) and 4 (CG).

Text in Illustration

*a	DLC3



SST: 09843-18040

NOTICE:

Be sure that terminals TC and CG are not connected. If the terminals are connected, the automatic transmission fluid level cannot be precisely adjusted due to fluctuations in engine speed.

HINT:

- Disconnecting terminals TC and CG activates the engine idle speed control mode.
- Even after terminals TC and CG are disconnected, automatic transmission fluid temperature detection mode will be active until the ignition switch is turned off.

(c) Allow the engine to idle until the automatic transmission fluid temperature reaches 35 to 45°C (95 to 113°F).

(d) The D shift indicator will come on again when the fluid temperature reaches 35°C (95°F) and will blink when it exceeds 45°C (113°F).

HINT:

Adjust the transmission fluid level when the "D" shift indicator is illuminated.

1. If the D shift indicator is not illuminated, idle the engine to warm it up until the D shift indicator illuminates.
2. If the D shift indicator is illuminated, immediately begin to adjust the automatic transmission fluid level.
3. If the D shift indicator is blinking, stop the engine to cool the automatic transmission fluid. Once the automatic transmission fluid temperature drops to the appropriate level, perform the

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automatic transmission fluid level adjustment procedure again.

D Shift Indicator:

BELOW AUTOMATIC TRANSMISSION FLUID LEVEL ADJUSTMENT (35°C OR LESS) (95°F OR LESS)	AUTOMATIC TRANSMISSION FLUID LEVEL ADJUSTMENT TEMPERATURE (35 TO 45°C) (95 TO 113°F)	ABOVE AUTOMATIC TRANSMISSION FLUID LEVEL ADJUSTMENT TEMPERATURE (45°C OR MORE) (113°F OR MORE)
OFF	ON	Blinks

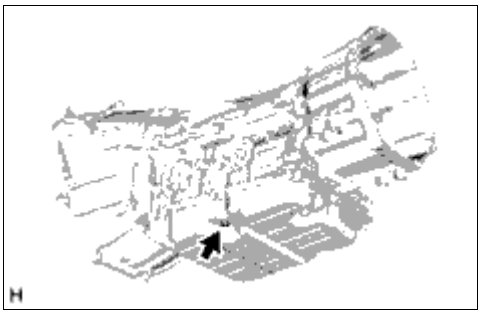
5. CHECK FLUID LEVEL

(a) Lift the vehicle.

NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within +/-1°).

(b) Using a 5 mm hexagon socket wrench, remove the overflow plug and gasket from the automatic transmission assembly.



CAUTION:

Be careful as the automatic transmission fluid coming out of the overflow hole is hot.

(c) Check the amount of automatic transmission fluid that comes out of the overflow hole.

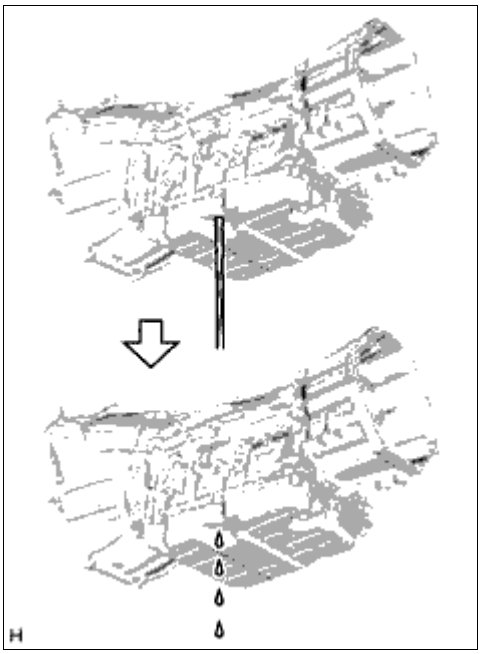
- If the amount of automatic transmission fluid that comes out of the overflow hole is large, proceed to step [*1].
- If no automatic transmission fluid comes out of the overflow hole, proceed to step [*2].

NOTICE:

If only a small amount of automatic transmission fluid (approximately 5 cc) comes out of the overflow hole, then only automatic transmission fluid remaining in the overflow tube of overflow hole has come out. This is not considered to be overflow.

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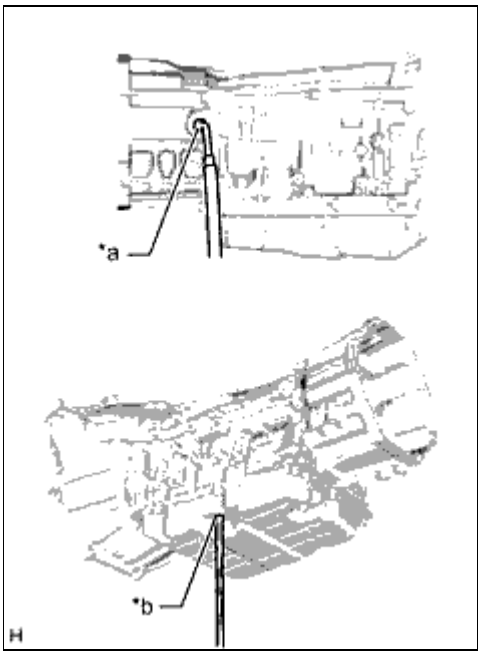
(d) If the amount of automatic transmission fluid that comes out of the overflow hole is large, wait until the automatic transmission fluid flow slows and only drips come out. [*1]



HINT:

The automatic transmission fluid flow will not stop completely because the automatic transmission fluid continues to expand as its temperature increases.

(e) If no automatic transmission fluid comes out of the overflow hole, remove the refill plug and O-ring. Then add automatic transmission fluid to the refill hole until it flows out of the overflow hole. Wait until the automatic transmission fluid flow slows and only drips come out. [*2]



Text in Illustration

*a	Refill Hole
*b	Overflow Hole

NOTICE:

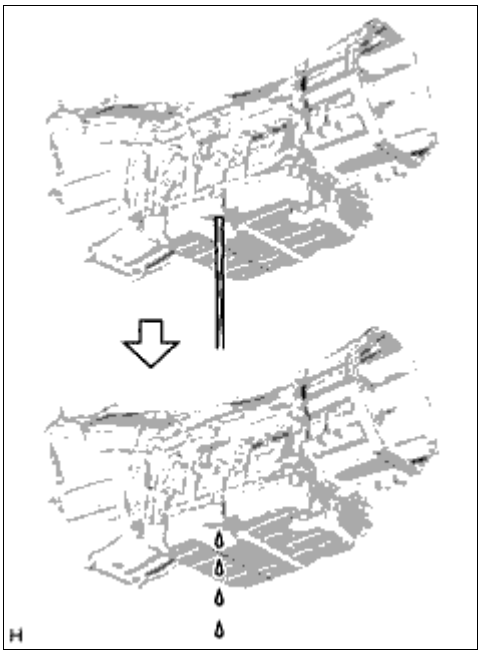
- Use Toyota Genuine ATF WS.
- Be sure to add automatic transmission fluid slowly. If automatic transmission fluid is added quickly, the automatic transmission fluid may hit internal parts and bounce back, resulting in automatic transmission fluid coming out of the refill hole.

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(f) Wait until the automatic transmission fluid flow slows and only drips come out.

HINT:

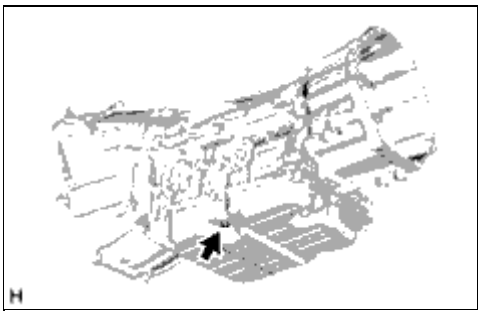
The automatic transmission fluid flow will not stop completely because the automatic transmission fluid continues to expand as its temperature increases.



(g) Using a 5 mm hexagon socket wrench, install a new gasket and the overflow plug to the automatic transmission assembly.

Torque:

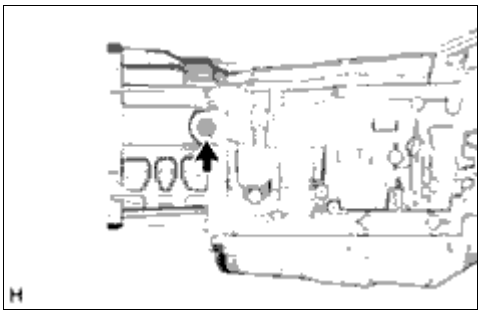
20 N·m {204 kgf·cm, 15ft·lbf}



(h) Install a new O-ring and the refill plug to the automatic transmission assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



(i) Lower the vehicle.

(j) Turn the ignition switch off.

HINT:

Turning the ignition switch off exits automatic transmission fluid temperature detection mode.

(k) Disconnect the Techstream from the DLC3 (when using the Techstream).

6. AFTER FILLING TRANSMISSION

(a) Lift the vehicle.

(b) Clean each part.

(c) Check for automatic transmission fluid leaks.

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(d) Lower the vehicle.

7. ATF THERMAL DEGRADATION ESTIMATE RESET (for 2TR-FE)

HINT:

Approximately 50% or more of the automatic transmission fluid has been replaced during a repair of the transmission or a similar operation INFO .

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Last Modified: 2-12-2016	6.6 A	**Doc ID:** RM000004LXE00TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION FLUID: REPLACEMENT; 2016 MY Tacoma [08/2015 -]		

REPLACEMENT

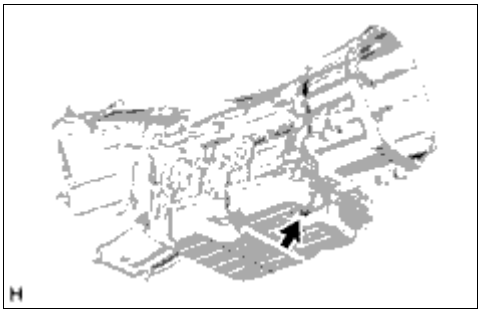
1. REPLACE AUTOMATIC TRANSMISSION FLUID

(a) Lift the vehicle. [*1]

NOTICE:

Set the vehicle on a lift so that the vehicle is kept level when it is lifted up (make sure that the tilt angle from the front to rear of the vehicle is within +/-1°).

(b) Remove the drain plug and gasket from the automatic transmission assembly and drain the automatic transmission fluid. [*2]

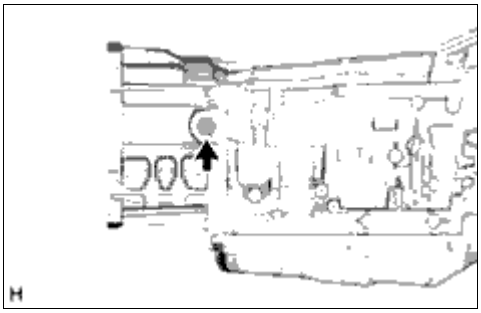


(c) Temporarily install the gasket and drain plug to the automatic transmission assembly. [*3]

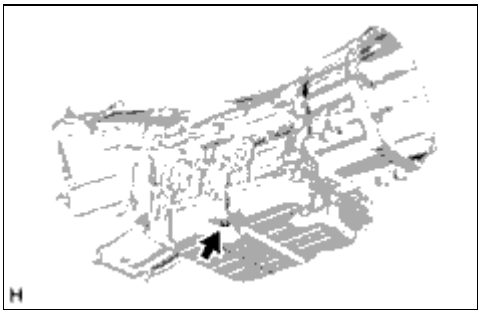
HINT:

Reuse the old gasket as the drain plug will be removed again.

(d) Remove the refill plug and O-ring from the automatic transmission assembly. [*4]

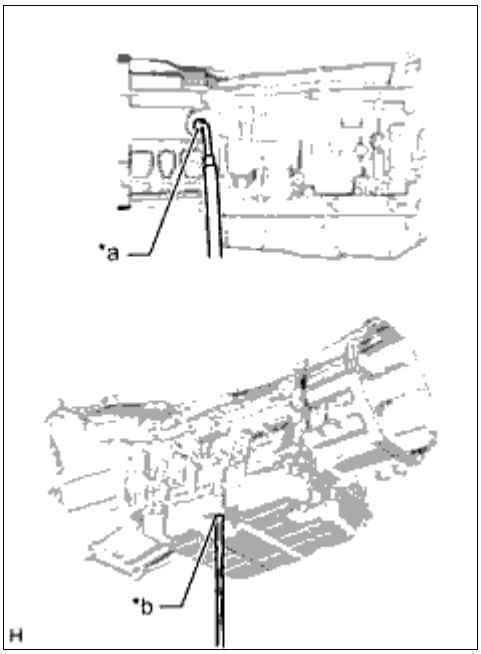


(e) Using a 5 mm hexagon socket wrench, remove the overflow plug and gasket from the automatic transmission assembly. [*5]



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(f) Add automatic transmission fluid to the refill hole until it flows out of the overflow hole. [*6]



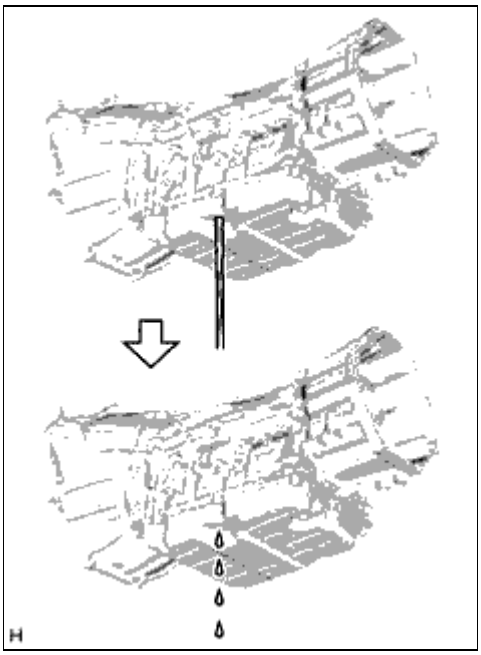
Text in Illustration

*a	Refill Hole
*b	Overflow Hole

NOTICE:

- Use Toyota Genuine ATF WS.
- Be sure to add automatic transmission fluid slowly. If automatic transmission fluid is added quickly, the automatic transmission fluid may hit internal parts and bounce back, resulting in automatic transmission fluid coming out of the refill hole.

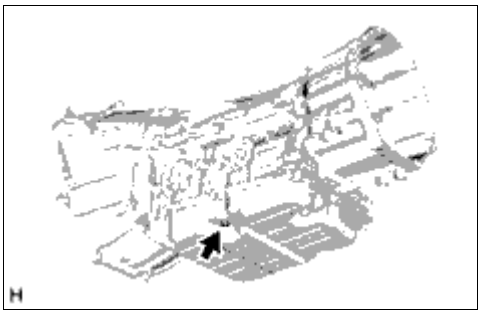
(g) Wait until the automatic transmission fluid flow slows and only drips come out. [*7]



(h) Using a 5 mm hexagon socket wrench, temporarily install the gasket and overflow plug to the automatic transmission assembly. [*8]

HINT:

Reuse the old gasket as the overflow plug will be removed again.



(i) Add the amount of automatic transmission fluid specified for removal and installation of the automatic transmission oil pan sub-assembly to the refill hole. [*9]

Specified amount of fluid:

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for 2GR-FKS

3.1 liters (3.3 US qts, 2.7 Imp. qts)

for 2TR-FE

1.5 liters (1.6 US qts, 1.3 Imp. qts)

HINT:

If the specified amount of automatic transmission fluid cannot be added, perform steps [*10] to [*15].

(j) Temporarily install the O-ring and refill plug to the automatic transmission assembly. [*10]

HINT:

Reuse the old O-ring as the refill plug will be removed again.

(k) Lower the vehicle. [*11]

(l) Start the engine. [*12]

NOTICE:

To reduce load, make sure that all electrical systems, such as the air conditioning, lighting system, electric fan and audio system, are off.

(m) Slowly move the shift lever from P to S, and then back to P. [*13]

(n) Allow the engine to idle for 30 seconds to warm it up. [*14]

(o) Turn the ignition switch off. [*15]

(p) Repeat steps [*1] to [*15].

(q) Repeat steps [*1] to [*2].

(r) Install a new gasket and the drain plug to the automatic transmission assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

(s) Repeat steps [*4] to [*11].

2. CHECK FLUID TEMPERATURE INFO

3. CHECK FLUID LEVEL INFO

4. AFTER FILLING TRANSMISSION INFO

5. ATF THERMAL DEGRADATION ESTIMATE RESET (for 2TR-FE)

HINT:

Approximately 50% or more of the automatic transmission fluid has been replaced during a repair of the transmission or a similar operation INFO .

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W780XBX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): CHECK MODE PROCEDURE; 2016 MY Tacoma [08/2015 -]		

CHECK MODE PROCEDURE

1. DESCRIPTION

(a) Check mode has a higher sensitivity to malfunctions and can detect malfunctions that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect. In check mode, DTCs are detected with 1 trip detection logic.

2. CHECK MODE PROCEDURE

(a) Make sure that the following conditions are met:

(1) Battery positive voltage 11 V or higher.

(2) Throttle valve fully closed.

(3) Shift lever in P or N.

(4) Air conditioning off.

(b) Turn the ignition switch off.

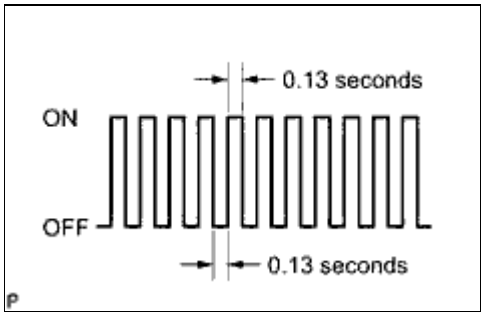
(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Utility / Check Mode.

(g) Change the ECM to check mode. Make sure the MIL flashes as shown in the illustration.



NOTICE:

All DTCs and freeze frame data will be cleared if: 1) the Techstream is used to change the ECM from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or off.

Before entering check mode, make notes of the DTCs and freeze frame data.

(h) Start the engine. The MIL should turn off after the engine starts.

(i) Perform Monitor Drive Pattern for the ECT test INFO .

(Or, simulate the conditions of the malfunction described by the customer.)

(j) After simulating the malfunction conditions, use the Techstream to check the DTC and freeze frame data.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7E0ZTX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DATA LIST / ACTIVE TEST; 2016 MY Tacoma [08/2015 -]		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	• This is the current vehicle speed. • The vehicle speed is detected using the wheel speed sensors. ○ There is a delay in when the vehicle speed data is displayed. Therefore, even if the vehicle speed listed in the freeze frame data is 0 km/h (0 mph), this does not always mean that the malfunction occurred when the vehicle was stopped.
Engine Speed	Engine speed/ Min.: 0 rpm Max.: 16383 rpm	550 to 650 rpm: Idling	When the crankshaft position sensor is malfunctioning, "Engine Speed" is approximately 0 rpm or varies greatly from

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
			the actual engine speed.
Calculate Load	Load calculated by ECM/ Min.: 0% Max.: 100%	-	• This is the engine load calculated based on the intake pressure. • Calculate Load = Actual intake manifold pressure / maximum intake manifold pressure x 100 (%) (For example, when the actual intake manifold pressure is the same as atmospheric pressure, Calculate Load is 100%.)
Coolant Temperature	Engine coolant temperature/ Min.: -40°C (-40°F) Max.: 140°C (284°F)	75 to 100°C (167 to 212°F): After warming up	This is the engine coolant temperature. **HINT:** • After warming up the engine, the engine coolant temperature is 75 to 100°C (167 to 212°F). • After a long soak, the engine coolant temperature, intake air temperature and ambient air temperature are approximately equal. • If the value is -40°C (-40°F), or 140°C (284°F), the sensor circuit is open or shorted. • Check if the engine overheats when the value indicated is higher than 140°C (284°F).
Intake Air Temperature	Intake air temperature/ Min.: -40°C (-40°F) Max.: 140°C (284°F)	Equivalent to ambient air temperature	• After a long soak, the engine coolant temperature, intake air temperature and ambient air temperature are approximately equal. • If the value is -40°C (-40°F), or 140°C (284°F), the sensor circuit is open or shorted.
Engine Run Time	Engine run time/ Min.: 0 sec Max.: 65535 sec	Time after engine start	This is the time elapsed since the engine started. **HINT:** The time is counted only while the engine is running.
Battery Voltage	Battery voltage/ Min.: 0 V Max.: 65.5 V	11 to 14 V: Idling	If 11 V or less, characteristics of some electrical components may change.
BATT Voltage	Battery voltage/ Min.: 0 V Max.: 79.998 V	11 to 14 V: Idling	If 11 V or less, characteristics of some electrical components may change.

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Throttle Position Sensor No.1 Voltage %	Absolute throttle position sensor (No. 1)/ Min.: 0% Max.: 100%	• 10 to 22%: Accelerator pedal fully released • 64 to 96%: Accelerator pedal fully depressed (engine running)	The No. 1 throttle position sensor output is converted using 5 V = 100%. **HINT:** If there are no throttle position sensor DTCs stored, it is possible to conclude that the throttle position sensor system is normal.
Starter SW	Starter signal/ ON or OFF	• ON: Starter operating • OFF: Starter not operating	-
Neutral Position SW	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Transfer L4	Transfer status/ ON or OFF	• ON: Transfer in L4 • OFF: Transfer not in L4	-
Stop Light SW	Stop light switch status/ ON or OFF	• ON: Brake pedal depressed • OFF: Brake pedal released	-
Cruise Main SW	Status of Cruise Main SW/ ON or OFF	-	-
Complete Parts Monitor	Comprehensive component monitor/ Not Avl or Avail	-	-
Fuel System Monitor	Fuel system monitor/ Not Avl or Avail	-	-
Misfire Monitor	Misfire monitor/ Not Avl or Avail	-	-
EGR/VVT Monitor	EGR/VVT monitor/	-	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Not Avl or Avail		
EGR/VVT Monitor Result	EGR/VVT monitor/ Compl or Incmpl	-	-
A/F (O2) Sensor Heater Monitor	A/F (O2) sensor heater monitor/ Not Avl or Avail	-	-
A/F (O2) Sensor Heater Monitor Result	A/F (O2) sensor heater monitor/ Compl or Incmpl	-	-
A/F (O2) Sensor Monitor	A/F (O2) sensor monitor/ Not Avl or Avail	-	-
A/F (O2) Sensor Monitor Result	A/F (O2) sensor monitor/ Compl or Incmpl	-	-
Secondary Air Injection System Monitor	Secondary air injection system monitor/ Not Avl or Avail	-	-
Secondary Air Injection System Monitor Result	Secondary air injection system monitor/ Compl or Incmpl	-	-
EVAP Monitor	EVAP monitor/ Not Avl or Avail	-	-
EVAP Monitor Result	EVAP monitor/ Compl or Incmpl	-	-
Heated Catalyst Monitor	Heated catalyst monitor/ Not Avl or Avail	-	-
Heated Catalyst Monitor Result	Heated catalyst monitor/ Compl or Incmpl	-	-
Catalyst Monitor	Catalyst monitor/ Not Avl or Avail	-	-
Catalyst Monitor Result	Catalyst monitor/ Compl or Incmpl	-	-
Component Monitor ENA (Current)	Comprehensive component monitor Unable or Enable	-	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Component Monitor Result (Current)	Comprehensive component monitor Compl or Incmpl	-	-
Fuel System Monitor ENA (Current)	Fuel system monitor Unable or Enable	-	-
Fuel System Monitor Result (Current)	Fuel system monitor Compl or Incmpl	-	-
Misfire Monitor ENA (Current)	Misfire monitor Unable or Enable	-	-
Misfire Monitor Result (Current)	Misfire monitor Compl or Incmpl	-	-
EGR/VVT Monitor ENA (Current)	EGR monitor Unable or Enable	-	-
EGR/VVT Monitor Result (Current)	EGR monitor Compl or Incmpl	-	-
O2 Sensor Heater ENA (Current)	O2S (A/FS) heater monitor Unable or Enable	-	-
O2 Sensor Heater Monitor Result (Current)	O2S (A/FS) heater monitor Compl or Incmpl	-	-
A/F (O2) Sensor Monitor ENA (Current)	O2S (A/FS) monitor Unable or Enable	-	-
A/F (O2) Sensor Monitor Result (Current)	O2S (A/FS) monitor Compl or Incmpl	-	-
Secondary Air Injection System Monitor ENA (Current)	Secondary air injection system monitor/ Unable or Enable	-	-
Secondary Air Injection System Monitor Result (Current)	Secondary air injection system monitor/ Compl or Incmpl	-	-
EVAP Monitor ENA (Current)	EVAP monitor Unable or Enable	-	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
EVAP Monitor Result (Current)	EVAP monitor Compl or Incmpl	-	-
Heated Catalyst Monitor ENA (Current)	Heated catalyst monitor/ Unable or Enable	-	-
Heated Catalyst Monitor Result (Current)	Heated catalyst monitor/ Compl or Incmpl	-	-
Catalyst Monitor ENA (Current)	Catalyst monitor/ Unable or Enable	-	-
Catalyst Monitor Result (Current)	Catalyst monitor/ Compl or Incmpl	-	-
TC Terminal	TC Terminal Status/ ON or OFF	-	-
MIL	MIL status/ ON or OFF	ON: MIL ON	-
MIL ON Run Distance	MIL ON run distance/ Min.: 0 km (0 mile) Max.: 65535 km (40723 mile)	Distance after DTC detected	-
Running Time from MIL ON	Running time from MIL ON/ Min.: 0 min Max.: 65535 min	Equivalent to running time after MIL ON	-
Time after DTC Cleared	Time after DTC cleared/ Min.: 0 min Max.: 65535 min	Equivalent to time after DTCs cleared	-
Distance from DTC Cleared	Distance from DTC cleared/ Min.: 0 km (0 mile) Max.: 65535 km (40723 mile)	Equivalent to time after DTCs cleared	-
Warmup Cycle Cleared DTC	Warm-up cycle after DTC cleared/ Min.: 0 Max.: 255	-	Number of warm-up cycles after DTCs cleared

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
OBD Requirements	OBD requirement/ -	-	-
Number of Emission DTC	Emission related DTCs/ Min.: 0 Max.: 127	-	-
Total Distance Traveled	Total distance traveled/ Min.: 0 km (0 mile) Max.: 16777215 km (10425361 mile)	-	-
Accel Position from EFI	Absolute accelerator pedal position/ Min.: 0 % Max.: 127.5 %	-	Value calculated by adding an adjustment value to the actual accelerator pedal position.
NT Sensor Speed	Input turbine speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm.
Speed (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-
SP2 Sensor Voltage	Transmission revolution sensor (SP2) sensor voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P • OFF: Shift lever not in P	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in R	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N, P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	-
Shift SW Status (S Range)	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.
A/T Oil Temperature No. 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.
Torque Converter Temperature Raise History	Torque converter temperature raise history status/ Min.: 0 Max.: 255	-	-
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-
Lock Up Status	Lock up/ ON or OFF	• ON: Lock-up operating • OFF: Lock-up not operating	-
Shift Status	ECM gear shift command/ 1st, 2nd, 3rd, 4th, 5th or 6th	Same as actual gear	-
Solenoid (SLT)	Shift solenoid valve SLT status/ ON or OFF	• ON: Shift solenoid valve SLT operating • OFF: Shift solenoid valve SLT not operating	-
Solenoid (SLU)	Shift solenoid valve SLU status/ ON or OFF	• ON: Shift solenoid valve SLU operating	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
		• OFF: Shift solenoid valve SLU not operating	
Solenoid (SL1)	Shift solenoid valve SL1 status/ ON or OFF	• ON: Shift solenoid valve SL1 operating • OFF: Shift solenoid valve SL1 not operating	-
Solenoid (SL2)	Shift solenoid valve SL2 status/ ON or OFF	• ON: Shift solenoid valve SL2 operating • OFF: Shift solenoid valve SL2 not operating	-
Solenoid (SL3)	Shift solenoid valve SL3 status/ ON or OFF	• ON: Shift solenoid valve SL3 operating • OFF: Shift solenoid valve SL3 not operating	-
Solenoid (SL4)	Shift solenoid valve SL4 status/ ON or OFF	• ON: Shift solenoid valve SL4 operating • OFF: Shift solenoid valve SL4 not operating	-
Solenoid (SL)	Shift solenoid valve SL status/ ON or OFF	• ON: Shift solenoid valve SL operating • OFF: Shift solenoid valve SL not operating	-

(h) Enter the following menus: Powertrain / Engine / Data List.

(i) According to the display on the Techstream, read the Data List.

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Shift Up SW	Sport shift up switch status/	• ON: Shift lever held in "+"	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ON or OFF	(up-shift) • OFF: Shift lever not held in "+" (up-shift)	
Sports Shift Down SW	Sport shift down switch status/ ON or OFF	• ON: Shift lever held in "-" (down-shift) • OFF: Shift lever not held in "-" (down-shift)	-
Power Mode SW	Power mode status/ ON or OFF	• ON: PWR mode on • OFF: PWR mode off	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the TC Terminal	Connects and disconnects TC and TE1. (changes to the fluid temperature detection mode)	ON/OFF	[Vehicle Condition] • Ignition switch ON • Vehicle stopped
Activate the Solenoid (SLU)	Operates shift solenoid valve SLU	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SLT)*	Operates shift solenoid valve SLT to raise the line pressure.	ON/OFF **HINT:** ON: No action (normal	[Vehicle Condition] • Vehicle Stopped • Engine idling

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
		operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid (SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	
Activate the Lock Up Solenoid	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF Start/Stop	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more
Activate the Solenoid (SL)	Operates shift solenoid valve SL	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd/3rd/4th/5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less
Activate the Solenoid (SL1)	Operates shift solenoid valve SL1	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL2)	Operates shift solenoid valve SL2	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL3)	Operates shift solenoid valve SL3	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Solenoid (SL4)	Operates shift solenoid valve SL4	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N

*: The "Activate the Solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

Note that the pressure readings for the Active Test and Hydraulic Test are different.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7I0U5X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DEFINITION OF TERMS; 2016 MY Tacoma [08/2015 -]		

DEFINITION OF TERMS

TERM	DEFINITION
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and details).
Related DTCs	Group of diagnostic trouble codes that are output by the ECM based on the same malfunction detection logic.
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM stores a DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring if multiple sensors and components are used to detect the malfunction. While one sensor is being monitored, the next sensor or component will not be monitored.
Required sensor / Components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects a malfunction only once during a single driving cycle. "Continuous" means that the ECM detects a malfunction every time the enabling conditions are met.
Duration	The minimum time for which the ECM must detect a continuous deviation in the monitored value(s) in order to store a DTC. Timing begins after the "typical enabling conditions" are met.
Typical malfunction thresholds	Value beyond which the ECM will determine that there is a malfunction and store a DTC.
MIL operation	MIL illumination timing after a malfunction is detected. "Immediate" means that the ECM illuminates the MIL the instant the ECM determines that there is a malfunction. "2 driving cycles" means that the ECM illuminates the MIL if the same malfunction is detected again in the next driving cycle.
Component operating range	Normal operation range of sensors and solenoids under normal driving conditions. Use these ranges as a reference. They cannot be used to judge if a sensor or solenoid is defective or not.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W76137X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DIAGNOSIS SYSTEM; 2016 MY Tacoma [08/2015 -]		

DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) When troubleshooting OBD II (On-Board Diagnostics) vehicles, an OBD II scan tool (complying with SAE J1987) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle ECM (Engine Control Module) can be then read.

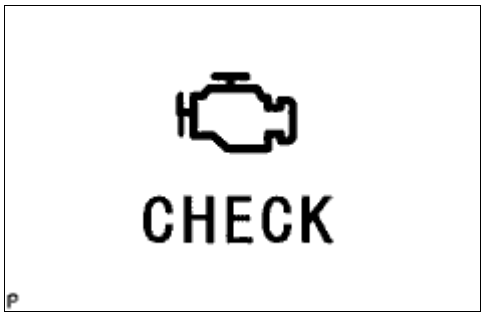
(b) OBD II regulations require that the vehicle on-board computer illuminate the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:

(1) The emission control system components.

(2) The powertrain control components (which affect vehicle emissions).

(3) The computer itself.

In addition, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



(c) To check for DTCs, connect the Techstream to the DLC3. The Techstream displays DTCs, freeze frame data, and a variety of the engine data. The DTCs and freeze frame data can be cleared with the Techstream. In order to enhance OBD function on vehicles and develop the off-board diagnosis system, Controller Area Network (CAN) communication is used in this system. CAN is a network which uses a pair of data transmission lines spanning multiple computers and sensors. It allows for high speed communications between the systems and simplification of the wire harness connections INFO .

2. NORMAL MODE AND CHECK MODE

(a) The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for duplicating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (the Techstream only).

3. 2 TRIP DETECTION LOGIC

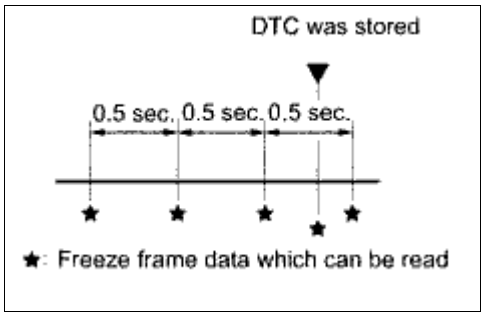
(a) When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the subsequent driving cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

(a) The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

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(b) The Techstream records freeze frame data in 5 different instances: 1) 3 times before the DTC is stored, 2) once when the DTC is stored, and 3) once after the DTC is stored. These sets of data can be used to simulate the vehicle condition around the time when the malfunction occurred. The data may help in finding the cause of the malfunction, or in judging if the DTC was caused by a temporary malfunction.



5. DLC3 (Data Link Connector 3)

(a) Check the DLC3 INFO .

6. BATTERY VOLTAGE

Standard Voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

7. MIL (Malfunction Indicator Lamp)

(a) The MIL illuminates when the turning the ignition switch to ON (the engine is not running).

(b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL does not illuminate when the turning the ignition switch to ON, check the MIL circuit INFO .

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Last Modified: 11-13-2015	6.6 S	**Doc ID:** RM000000W710QUX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DIAGNOSTIC TROUBLE CODE CHART; 2016 MY Tacoma [08/2015 -]		

DIAGNOSTIC TROUBLE CODE CHART

- If a DTC is displayed during the DTC check, check the parts listed in the table below and proceed to the "See page" given.
- *1: "Comes on" means the Malfunction Indicator Lamp (MIL) illuminates.
- *2: "DTC stored" means the ECM memorizes the trouble code if the ECM detects the DTC detection condition.
- These DTCs may be output when the clutches, brakes, gear components, etc., inside the automatic transmission are damaged.

Automatic Transmission System

DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P050031	Vehicle Speed Sensor "A" No Signal	Comes on	DTC stored	INFO
P056014	System Voltage Circuit Short to Ground or Open	Comes on	DTC stored	INFO
P061512	Starter Relay Circuit Short to Battery	Comes on	DTC stored	INFO
P062F44	Internal Control Module EEPROM Data Memory Failure	Comes on	DTC stored	INFO
P070312	Brake Switch "B" Circuit Short to Battery	Comes on	DTC stored	INFO
P070513	Transmission Range Sensor "A" Circuit Open	Comes on	DTC stored	INFO
P070562	Transmission Range Sensor "A" Signal Compare Failure	Comes on	DTC stored	INFO
P071000	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	Comes on	DTC stored	INFO
P071011	Transmission Fluid Temperature Sensor "A" Circuit Short To Ground	Comes on	DTC stored	INFO
P071015	Transmission Fluid Temperature Sensor "A" Circuit Short to Battery or Open	Comes on	DTC stored	INFO
P071512	Input/Turbine Speed Sensor "A" Circuit Short to Battery	Comes on	DTC stored	INFO
P071514	Input/Turbine Speed Sensor "A" Circuit Short to Ground or Open	Comes on	DTC stored	INFO
P071531	Input/Turbine Speed Sensor "A" No Signal	Comes on	DTC stored	INFO

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DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P072012	Output Speed Sensor Circuit Short to Battery	Comes on	DTC stored	INFO
P072014	Output Speed Sensor Circuit Short to Ground or Open	Comes on	DTC stored	INFO
P072031	Output Speed Sensor No Signal	Comes on	DTC stored	INFO
P074011	Torque Converter Clutch Circuit Short to Ground	Comes on	DTC stored	INFO
P074015	Torque Converter Clutch Circuit Short to Battery or Open	Comes on	DTC stored	INFO
P07407F	Torque Converter Clutch Actuator Stuck Off	Comes on	DTC stored	INFO
P074513	Pressure Control Solenoid "A" Circuit Open	Comes on	DTC stored	INFO
P07457F	Pressure Control Solenoid "A" Actuator Stuck Off	Comes on	DTC stored	INFO
P077513	Pressure Control Solenoid "B" Circuit Open	Comes on	DTC stored	INFO
P07757F	Pressure Control Solenoid "B" Actuator Stuck Off	Comes on	DTC stored	INFO
P079513	Pressure Control Solenoid "C" Circuit Open	Comes on	DTC stored	INFO
P07957F	Pressure Control Solenoid "C" Actuator Stuck Off	Comes on	DTC stored	INFO
P271313	Pressure Control Solenoid "D" Circuit Open	Comes on	DTC stored	INFO
P27137F	Pressure Control Solenoid "D" Actuator Stuck Off	Comes on	DTC stored	INFO
P274011	Transmission Fluid Temperature Sensor "B" Circuit Short to Ground	-	DTC stored	INFO
P274015	Transmission Fluid Temperature Sensor "B" Circuit Short to Battery or Open	-	DTC stored	INFO
P275613	Torque Converter Clutch Pressure Control Solenoid Control Circuit Open	Comes on	DTC stored	INFO
P27567F	Torque Converter Clutch Pressure Control Solenoid Control Actuator Stuck Off	Comes on	DTC stored	INFO
P277111	Four Wheel Drive (4WD) Low Switch Circuit Short to Ground	Comes on	DTC stored	INFO
P277115	Four Wheel Drive (4WD) Low Switch Circuit Short to Battery or Open	Comes on	DTC stored	INFO
P280713	Pressure Control Solenoid "G" Circuit Open	Comes on	DTC stored	INFO

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DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P28077F	Pressure Control Solenoid "G" Actuator Stuck Off	Comes on	DTC stored	INFO
U010087	Lost Communication with ECM/PCM "A" Missing Message	Comes on	DTC stored	INFO

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7712GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): DTC CHECK / CLEAR; 2016 MY Tacoma [08/2015 -]		

DTC CHECK / CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are cleared. Before changing modes, always check and make a note of DTCs and freeze frame data.

HINT:

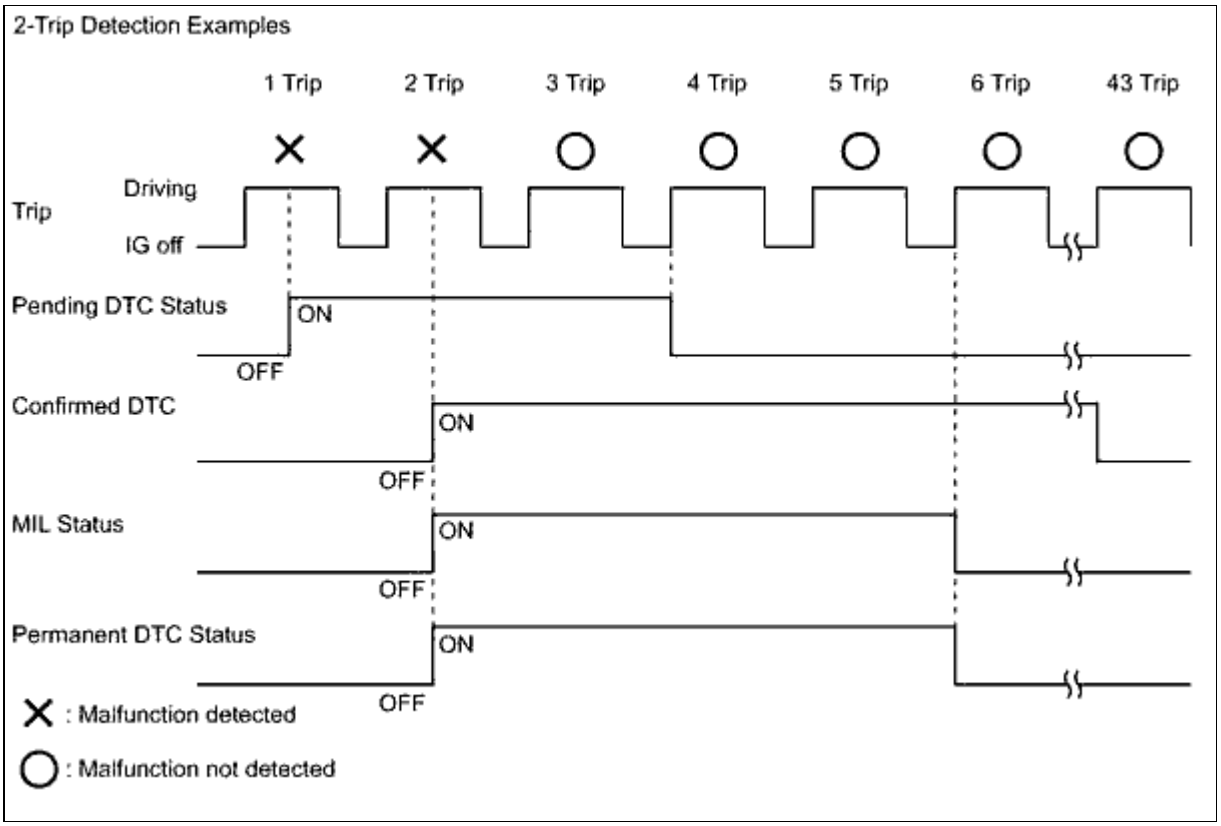
- DTCs which are stored in the ECM can be displayed on the Techstream. The Techstream can display current, pending and permanent DTCs.
- If a malfunction is detected during the current driving cycle, current and permanent DTCs are stored.
- Some DTCs are not stored if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- Current and pending DTCs can be cleared by using the Techstream or by disconnecting the cable from the negative battery terminal. However, permanent DTCs cannot be cleared using either of these two methods.
- After clearing current DTCs using the Techstream (or by disconnecting the cable from the negative battery terminal), permanent DTCs can be cleared when the system is determined to be normal for the relevant DTCs and then the universal trip is performed.

2 Trip Detection Examples

Pending DTC	Store condition	Malfunction detected
	Clear condition	System determined to be normal or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Confirmed DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	No malfunctions in 40 driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Permanent DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	Ignition switch turned to ON after no malfunction is detected in 3 consecutive driving cycles or After DTCs cleared using Techstream or cable disconnected from negative battery terminal, malfunction not detected when universal trip driving performed
MIL	ON	Malfunction detected (2nd trip)

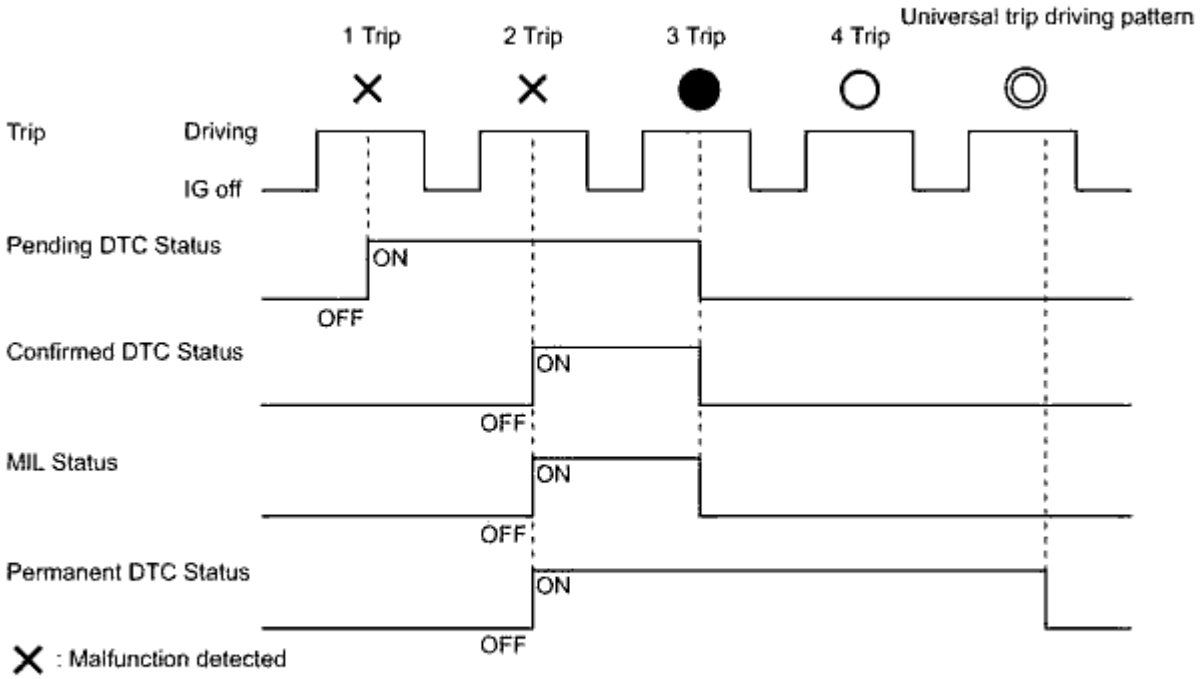
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	OFF	Ignition switch turned to ON after no malfunction is detected in 3 consecutive driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal



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2-Trip Detection Examples (Instance when DTCs were cleared midway through by using the Techstream or by disconnecting the cable from the negative battery terminal)



: Malfunction detected

: After problem areas repaired and DTCs cleared, DTC check performed

: Malfunction not detected

: Universal trip performed

1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Check the DTC(s) and freeze frame data, and then write them down.

TECHSTREAM DISPLAY	DESCRIPTION
Test Failed	Shows the malfunction judgment results during the current trip.
Pending	Shows the malfunction judgment results up to now. (Indicates the possibility of a malfunction when no DTC is confirmed.)
Confirmed	Shows the DTCs confirmed up to now. (The number of current trips differs for each DTC.)

(f) Check the details of the DTC(s) INFO .

2. CLEAR DTC (Pending and Confirmed DTC)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

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(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Clear the DTCs.

3. CLEAR PERMANENT DTC

HINT:

Even if the following procedure is not performed, permanent DTCs are cleared if no malfunction are detected during 3 consecutive driving cycles.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

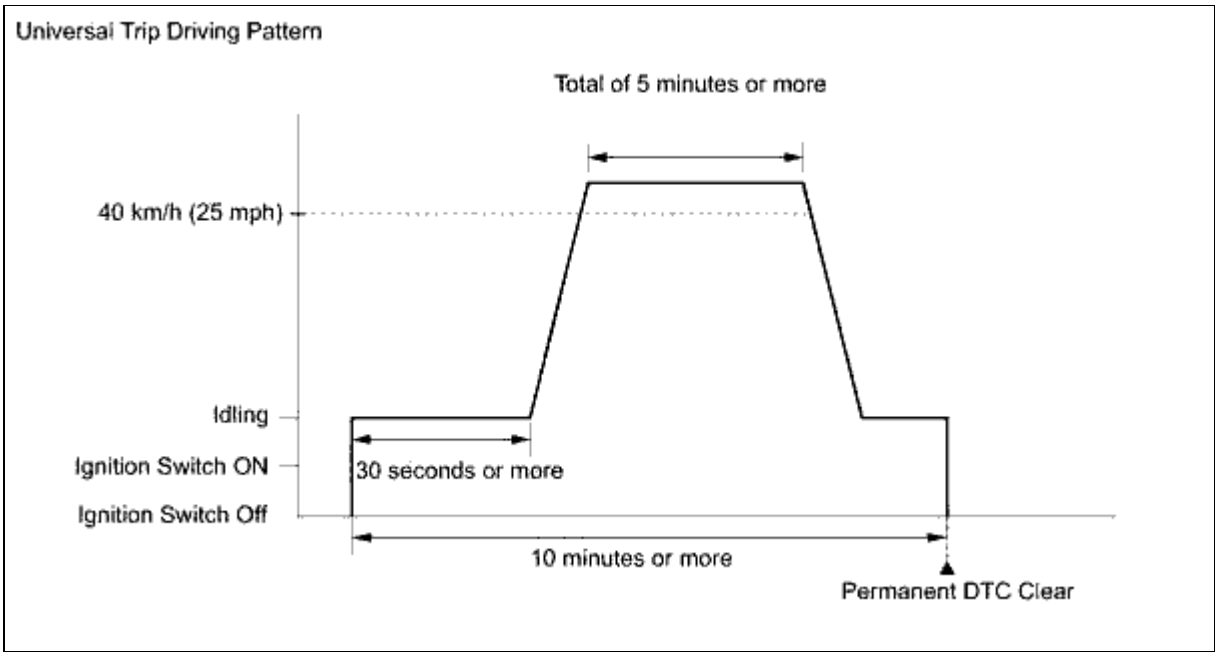
(e) Check if permanent DTCs are stored.

HINT:

If permanent DTCs are not output, it is not necessary to continue this procedure.

(f) Clear the DTCs.

(g) Perform the universal trip.



(1) Idle the engine for 30 seconds or more.

(2) Drive the vehicle at 40 km/h (25 mph) or more for a total of 5 minutes or more.

HINT:

- It is possible to complete the drive pattern even if the vehicle decelerates to less than 40 km/h (25 mph) during the driving cycle provided that the vehicle is driven at 40 km/h (25 mph) or more for a total of 5 minutes.
- When accelerating through the gears, make sure the vehicle is driven so all gears are used in order and no gears are skipped.

(3) Allow 10 minutes or more to elapse from the time the engine is started.

(h) Turn the ignition switch off.

(i) Wait 15 seconds.

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(j) Turn the ignition switch to ON.

(k) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(l) Check that the permanent DTCs have been cleared.

HINT:

- If permanent DTCs have not been cleared, perform the universal trip again.
- Permanent DTCs are cleared when the universal trip is completed.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000O8L0TSX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): FAIL-SAFE CHART; 2016 MY Tacoma [08/2015 -]		

FAIL-SAFE CHART

1. Fail-safe

This function minimizes the loss of operation when any abnormality occurs in a sensor or solenoid.

Fail-safe Control List

MALFUNCTION PART	FUNCTION
Transmission revolution sensor (NT)	During a transmission revolution sensor (NT) malfunction, shift control is performed based on the transmission revolution sensor (SP2) signal.
Transmission revolution sensor (SP2)	During a transmission revolution sensor (SP2) malfunction, shift control is performed based on the wheel speed sensor signal.
ATF temperature sensors (No. 1 and No. 2)	During an ATF temperature sensor malfunction, up-shifting to 5th and 6th is prohibited.
Shift solenoid valve SL1, SL2, SL3 and SL4	Stop the conduction of electric power to a failed solenoid and shift gears by turning on/off normal solenoids. If all solenoids are malfunctioning, gears will be selected through mechanical hydraulic circuits.
Shift solenoid valve SLT	During a shift solenoid valve SLT malfunction, the current to the shift solenoid valve is stopped. However, shifting is performed through normal clutch pressure control.
Shift solenoid valve SLU	During a shift solenoid valve SLU malfunction, the current to the shift solenoid valve is stopped. This stops lock-up control, thus decreasing fuel economy.

Shift Solenoid Valve Operation when Normal

GEAR POSITION	1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

Fail-safe Control Chart

GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON Malfunction (without Fail-safe Control)*	1st	2nd	3rd	4th	4th	4th
	OFF Malfunction (without Fail-safe Control)	1st to N	2nd to N	3rd to N	4th to N	5th	6th
	Fail-safe Control during OFF Malfunction	Fixed in 3rd or 5th					

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GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL2	ON Malfunction (without Fail-safe Control)*	1st to 4th	2nd to 4th	3rd to 4th	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd	4th to 1st	5th to N	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 2nd or 3rd					
Shift solenoid valve SL3	ON Malfunction (without Fail-safe Control)*	1st to 2nd	2nd	3rd	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd to 1st	3rd	4th	5th	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 3rd					
Shift solenoid valve SL4	ON Malfunction (without Fail-safe Control)*	3rd	3rd	3rd	4th	5th	5th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd to 1st	4th	5th to N	6th
	Fail-safe Control during OFF Malfunction	Fixed in 2nd					

*: Fail-safe control is not actuated when an ON malfunction occurs.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W6Z17GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): HOW TO PROCEED WITH TROUBLESHOOTING; 2016 MY Tacoma [08/2015 -]		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The ECM of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN and multiplex communication system.
- *: Use the Techstream.

1.	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2.	**CUSTOMER PROBLEM ANALYSIS**

(a) Refer to the How to Troubleshoot ECU Controlled Systems in Introduction section INFO .

NEXT

3.	**INSPECT BATTERY VOLTAGE**

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

4.	**CONNECT TECHSTREAM TO DLC3***

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NEXT

5.	**CHECK AND CLEAR DTCS AND FREEZE FRAME DATA***

(a) Refer to DTC Check/Clear INFO .

NEXT

6.	**VISUAL INSPECTION**

NEXT

7.	**SELECT CHECK MODE DIAGNOSIS***

(a) Refer to Check Mode Procedure INFO .

NEXT

8.	**PROBLEM SYMPTOM CONFIRMATION**

(a) Refer to Road Test INFO .

Result

RESULT	PROCEED TO
Symptom does not occur	A
Symptom occurs	B

B **GO TO STEP 10**

A

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9.	**SYMPTOM SIMULATION**

(a) Refer to Symptom Simulation INFO .

NEXT

10.	**DTC CHECK***

(a) Refer to DTC Check/Clear INFO .

Result

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B **GO TO STEP 18**

A

11.	**BASIC INSPECTION**

(a) Refer to Park/Neutral Position Switch INFO .

(b) Refer to Shift Lever Assembly INFO .

NG **GO TO STEP 21**

OK

12.	**MECHANICAL SYSTEM TESTS**

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(a) Refer to Mechanical System Tests INFO .

NG ▶ **GO TO STEP 17**

OK ▼

13.	**HYDRAULIC TEST**

(a) Refer to Hydraulic Test INFO .

NG ▶ **GO TO STEP 17**

OK ▼

14.	**MANUAL SHIFTING TEST**

(a) Refer to Manual Shifting Test INFO .

NG ▶ **GO TO STEP 16**

OK ▼

15.	**PROBLEM SYMPTOMS TABLE CHAPTER 1**

(a) Refer to Problem Symptoms Table INFO .

NG ▶ **GO TO STEP 19**

OK ▼

16.	**PROBLEM SYMPTOMS TABLE CHAPTER 2**

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(a) Refer to Problem Symptoms Table INFO .

NEXT

17.	**COMPONENT INSPECTION**

NEXT **GO TO STEP 21**

18.	**DTC CHART**

(a) Refer to Diagnostic Trouble Code Chart INFO .

NEXT

19.	**CIRCUIT INSPECTION**

NEXT

20.	**IDENTIFICATION OF PROBLEM**

NEXT

21.	**REPAIR OR REPLACE**

NEXT

22.	**CONFIRMATION TEST**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7B0UIX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): HYDRAULIC TEST; 2016 MY Tacoma [08/2015 -]		

HYDRAULIC TEST

1. PERFORM HYDRAULIC TEST

(a) Measure the line pressure.

CAUTION:

The line pressure test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.
- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.
- When conducting stall test, do not continue for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(1) Warm up the ATF (Automatic Transmission Fluid).

(2) Turn the ignition switch off.

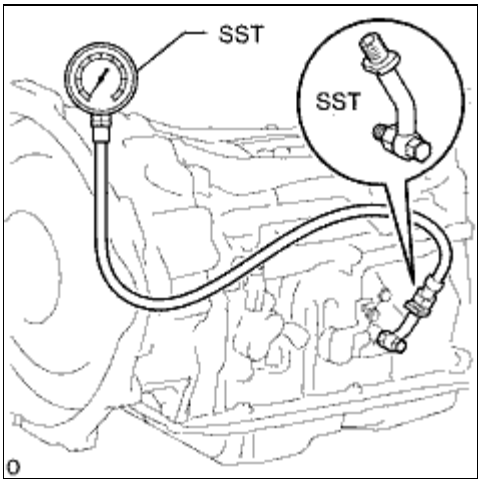
(3) Lift the vehicle up.

(4) Remove the test plug from the transmission case and connect SST.

SST: 09993-19015

09993-00010

09993-00040



(5) Lower the vehicle.

(6) Fully apply the parking brake and chock the 4 wheels.

(7) Start the engine and check the idling speed.

(8) Keep your left foot pressed firmly on the brake pedal and move the shift lever to D.

(9) Fully depress the accelerator pedal with your right foot. Quickly read the highest line pressure when the engine speed reaches the stall speed.

(10) In the same manner, perform the test with the shift lever in R.

Specified Line Pressure

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CONDITION	D POSITION	R POSITION
Stall speed	1450 to 1740 kPa (14.8 to 17.7 kgf/cm ^{2} , 210 to 252 psi)	1550 to 1840 kPa (15.8 to 18.8 kgf/cm ^{2} , 225 to 267 psi)

Evaluation

PROBLEM	POSSIBLE CAUSE
Measured values are higher than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective
Measured values are lower than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective • Oil pump defective
Pressure is low in D position only	• D position circuit fluid leak • No. 1 clutch (C1) defective
Pressure is low in R position only	• R position circuit fluid leak • No. 2 brake (B2) defective • No. 3 brake (B3) defective

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7F0RYX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): INITIALIZATION; 2016 MY Tacoma [08/2015 -]		

INITIALIZATION

1. RESET MEMORY

NOTICE:

- Perform Reset Memory (AT initialization) when replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves.
- Reset Memory can be performed only with the Techstream.

HINT:

The ECM memorizes the vehicle conditions when the ECT controls the automatic transmission assembly and transmission valve body assembly. Therefore, when the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

The reset procedure is as follows.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Utility / Reset Memory.

NOTICE:

After performing Reset Memory, be sure to perform the Road Test INFO described earlier.

HINT:

The ECM learns through the Road Test.

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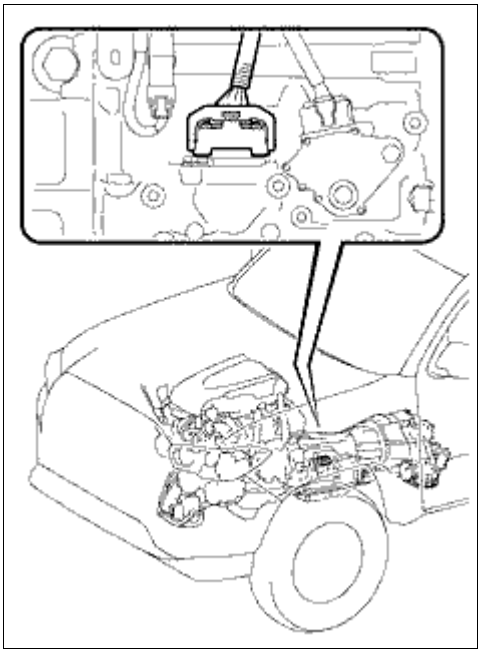
Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7C10JX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): MANUAL SHIFTING TEST; 2016 MY Tacoma [08/2015 -]		

MANUAL SHIFTING TEST

1. PERFORM MANUAL SHIFTING TEST

HINT:

- Using this test, it can be determined whether a problem is in an electrical circuit or if it is a mechanical problem in the transmission.
- If any abnormalities are found in the following test, the problem is in the transmission itself.



(a) Disconnect the connector of the transmission wire.

HINT:

It is possible to deactivate the electrical shift control by disconnecting the transmission wire. The gears can then be changed mechanically with the shift lever.

(b) Drive the vehicle with the transmission wire disconnected. Move the shift lever to each position to check whether the gear changes as shown in the table below.

SHIFT LEVER POSITION	GEAR
P	P
R	R
D	3rd

(c) Connect the connector of the transmission wire.

(d) Clear the DTCs INFO .

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7A0VVX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): MECHANICAL SYSTEM TESTS; 2016 MY Tacoma [08/2015 -]		

MECHANICAL SYSTEM TESTS

1. STALL SPEED TEST

HINT:

This test is to check the overall performance of the engine and transmission.

CAUTION:

- This test should be done on a paved surface (a surface that is not slippery).
- To ensure safety, perform this test in an open and level area that provides good traction.
- The stall speed test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Do not perform the stall speed test for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Chock all 4 wheels.

(h) Set the parking brake and keep the brake pedal depressed firmly with your left foot.

(i) Move the shift lever to D.

(j) Depress the accelerator pedal as much as possible with your right foot.

(k) Read the engine speed (stall speed) and release the accelerator pedal immediately.

Standard value:

STALL SPEED		
2220 rpm	+ 200 rpm	
	- 200 rpm	

Evaluation

TEST RESULT	POSSIBLE CAUSE
Stall speed is lower than standard value	• Engine power output may be insufficient • Stator one-way clutch is not operating properly • Torque converter assembly is faulty (stall speed is less than standard value by 600 rpm or more)

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TEST RESULT	POSSIBLE CAUSE
Stall speed is higher than standard value	• Line pressure is too low • No. 1 clutch (C1) is slipping • No. 3 one-way clutch (F3) is not operating properly • Improper fluid level

2. SHIFT TIME LAG TEST

HINT:

When the shift lever is moved while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the clutch, and brake.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Set the parking brake and keep the brake pedal depressed firmly.

(h) Check the D position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to D and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

(i) Check the R position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to R and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

Standard value:
D position time lag is less than 1.2 seconds
R position time lag is less than 1.5 seconds

Evaluation

TEST RESULT	POSSIBLE CAUSE
D position time lag exceeds standard value	• Line pressure is too low • No. 1 clutch (C1) is worn • No. 3 one-way clutch (F3) is not operating properly
R position time lag exceeds standard value	• Line pressure is too low • No. 2 brake (B2) is worn • No. 3 brake (B3) is worn

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7K0VPX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): MONITOR DRIVE PATTERN; 2016 MY Tacoma [08/2015 -]		

MONITOR DRIVE PATTERN

1. TEST MONITOR DRIVE PATTERN FOR ECT

CAUTION:

Perform this drive pattern on a level surface and strictly observe the posted speed limits and traffic laws while driving.

HINT:

Performing this drive pattern is one method to simulate the ECM (ECT) malfunction detection conditions.

Some DTCs may not be detected through ordinary, everyday driving. Also, DTCs may not be detected through this drive pattern.

(a) Preparation for driving

(1) Warm up the engine sufficiently (engine coolant temperature is 60°C (140°F) or higher).

(2) Drive the vehicle when the atmospheric temperature is -10°C (14°F) or higher.

Some malfunctions are not detected when the atmospheric temperature is below -10°C (14°F).

(b) Drive pattern

(1) Drive the vehicle through all the gears.

Stop → 1st → 2nd → 3rd → 4th → 5th → 6th → 6th (lock-up ON).

(2) Perform an engine brake test with the shift lever in S. While driving in the S6 range and 6th gear lock-up, move the shift lever to "-" and down-shift from 6th → 5th, 5th → 4th, 4th → 3rd, 3rd → 2nd and 2nd → 1st.

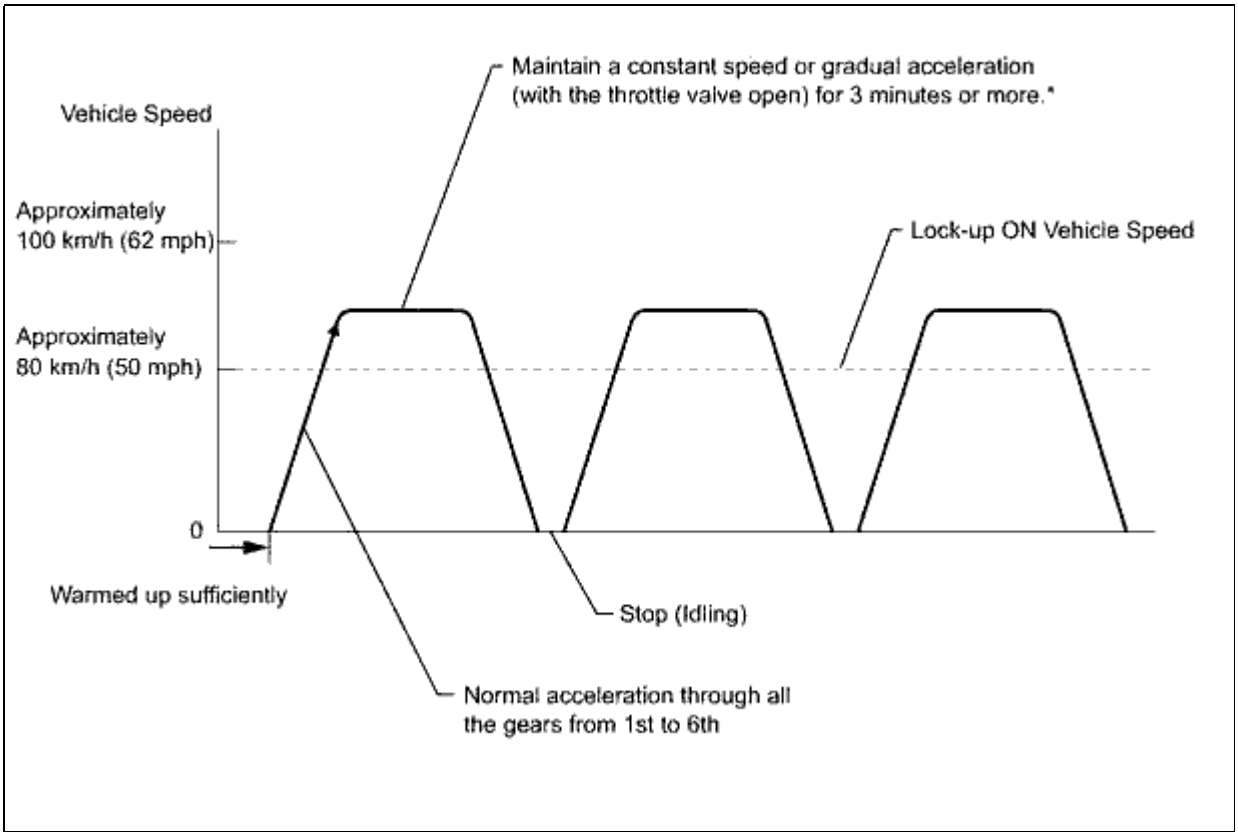
Check that engine braking is normal for every down-shift.

(3) Repeat the above drive pattern three times or more.

NOTICE:

- When using the Techstream, the monitor status can be checked in the Data List INFO .
- In the event that the drive pattern must be interrupted (due to traffic conditions or other factors), the drive pattern can be resumed and, in most cases, the monitor can be completed.

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HINT:

*: Drive the vehicle at a speed in top gear that will cause lock-up to engage. The vehicle can be driven at a speed lower than that in the above diagram under the lock-up condition.

NOTICE:

It is necessary to drive the vehicle for approximately 30 minutes to detect DTC P071000 (No. 1 ATF temperature sensor malfunction).

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5U000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P050031; Vehicle Speed Sensor "A" No Signal; 2016 MY Tacoma [08/2015 -]		

DTC	**P050031**	**Vehicle Speed Sensor "A" No Signal**

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU. The skid control ECU converts these wheel speed signals into a pulse signal and outputs it to the ECM via the combination meter. The ECM determines the vehicle speed based on the frequency of this pulse signal.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P050031	All conditions are met for 5 seconds or more (1 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Either condition is met. • Gear position is 1st: Transmission revolution sensor (NT) value is 1310 rpm or more. • Gear position is 2nd, 3rd, 4th, 5th or 6th: Transmission revolution sensor (NT) value is 760 rpm or more. (c) Transmission revolution sensor (SP2) value is 9 km/h (5.59 mph) or more. (d) No vehicle speed is transmitted to the ECM.	• Open or short in vehicle speed signal circuit • Combination meter system • ECM	P0500

MONITOR DESCRIPTION

The ECM assumes that the vehicle is being driven when the indicated vehicle speed is 9 km/h (5.59 mph) or more. If there is no speed signal from the combination meter despite this condition being met, the ECM interprets this as a malfunction in the speed signal circuit. The ECM then illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0500: Vehicle speed sensor/Verify pulse input
Required sensors/components (Main)	Vehicle speed sensor, Combination meter, Skid control ECU
Required sensors/components (Sub)	Transmission revolution sensor (SP2), ECT sensor
Frequency of operation	Continuous
Duration	5 sec.
MIL operation	Immediately
Sequence operation	None

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TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
Engine	Running
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
D position switch	ON
Park/neutral position switch (NSW)	OFF
Time after ignition switch OFF to ON	3 sec. or more
Pressure control solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected
Vehicle speed at output speed sensor	9 km/h (5.59 mph) or more
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more
2. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

Vehicle speed sensor signal	No signal

WIRING DIAGRAM

Refer to SFI system DTC P050031 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the Ignition switch ON and wait for 3 seconds or more.
2. Drive the vehicle at 9 km/h (5.59 mph) or more for 5 seconds or more.

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3. Check for DTCs again INFO .

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (VEHICLE SPEED)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) Drive the vehicle.

(f) In accordance with the display on the Techstream, read the Data List.

Transmission

TECHSTREAM DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	• This is the current vehicle speed. • The vehicle speed is detected using the wheel speed sensors. ○ There is a delay in when the vehicle speed data is displayed. Therefore, even if the vehicle speed listed in the freeze frame data is 0 km/h (0 mph), this does not always mean that the malfunction occurred when the vehicle was stopped.

OK:
Vehicle speed displayed on Techstream and speedometer display are equal.

NG ▶ **GO TO STEP 2**

OK ▶ **CHECK FOR INTERMITTENT PROBLEMS**

2.	**CHECK COMBINATION METER SYSTEM**

(a) Check the circuits that send vehicle speed signals to this system in the meter system INFO .

(b) During inspection for the meter section, if there is an instruction that indicates to go back to inspections for each system, proceed to the next step.

NEXT

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3.	**CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - ECM)**

(a) Disconnect the C9 combination meter assembly connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C9-40 (+S) - E13-24 (SPD)	Always	Below 1 Ω
C9-40 (+S) or E13-24 (SPD) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5V000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P056014; System Voltage Circuit Short to Ground or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P056014**	**System Voltage Circuit Short to Ground or Open**

DESCRIPTION

The battery supplies power to the ECM even when the ignition switch is off. This power allows the ECM to store data such as DTC history, freeze frame data and fuel trim values. If the battery voltage falls below a minimum level, the ECM data is cleared and the ECM determines that there is a malfunction in the power supply circuit. The next time the engine is started, the ECM will illuminate the MIL and store the DTC.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P056014	Open or short in ECM back-up power source circuit for 3 seconds or more (1 trip detection logic).	• Back-up power source circuit • Battery terminals • Battery • ECM	P0562

HINT:

If DTC P056014 is stored, the ECM does not store other DTCs.

MONITOR STRATEGY

Related DTCs	P0560: ECM system voltage/Range check (Low voltage)
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Sub)	-
Frequency of Operation	Continuous
Duration	3 sec.
MIL Operation	Immediately (MIL illuminated after next engine start)
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

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Continuous battery voltage	Below 3.5 V

WIRING DIAGRAM

Refer to SFI system DTC P056014 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the Ignition switch ON and wait for 3 seconds or more.
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT BATTERY**

(a) Inspect that the battery is not depleted INFO .

OK:

Battery is not depleted

NG ▶ **CHARGE OR REPLACE BATTERY**

OK ▼

2.	**CHECK BATTERY TERMINAL**

(a) Check that the battery terminals are not loose or corroded.

OK:

Battery terminals are not loose or corroded

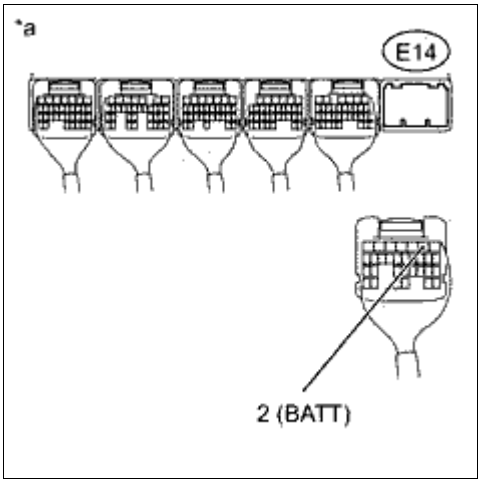
NG ▶ **REPAIR OR REPLACE BATTERY TERMINAL**

OK ▼

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3.	**CHECK TERMINAL VOLTAGE (POWER SOURCE OF ECM)**

(a) Disconnect the ECM connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E14-2 (BATT) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (BATTERY - ECM)**

OK ▼

4.	**CHECK WHETHER DTC OUTPUT RECURS (DTC P056014)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Clear the DTCs INFO .

(e) Turn the Ignition switch off and wait for at least 30 seconds.

(f) Turn the Ignition switch ON.

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(g) Turn the Techstream on.

(h) Wait 5 seconds or more.

(i) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(j) Read the DTCs using the Techstream.

Result:

RESULT	PROCEED TO
DTC P056014 is output	A
DTC is not output	B

B ▶ **CHECK FOR INTERMITTENT PROBLEMS**

A ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5W000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P061512; Starter Relay Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P061512**	**Starter Relay Circuit Short to Battery**

DESCRIPTION

While the engine is being cranked, positive battery voltage is applied to terminal STA of the ECM. If the ECM detects the starter control (STA) signal while the vehicle is being driven, it determines that there is a malfunction in the STA circuit. The ECM then illuminates the MIL and stores the DTC.

This monitor runs when the vehicle is driven at 20 km/h (12.43 mph) or more for 20 seconds or more.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P061512	All of the following conditions are met, and a (+B) battery voltage of 10.5 V or higher is applied to the ECM for 20 seconds or more (1 trip detection logic): (a) The vehicle speed is 20 km/h (12.43 mph) or more. (b) The engine speed is 1000 rpm or more. (c) The STA signal is on.	• Park/Neutral position switch • STA signal circuit • ECM	P0617

MONITOR STRATEGY

Related DTCs	P0617: Starter signal/Verify input signal
Required Sensors/Components (Main)	Starter relay (ST), Park/neutral position switch, Certification ECU (smart key ECU assembly)*1
Required Sensors/Components (Sub)	Vehicle speed sensor (VSS), Crankshaft Position (CKP) sensor
Frequency of Operation	Continuous
Duration	20 sec.
MIL Operation	Immediately
Sequence of Operation	None

*1: w/ Smart key system

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	10.5 V or higher
Ignition switch	ON

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Vehicle speed	20 km/h (12.43 mph) or more
Engine speed	1000 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

Starter signal	ON

WIRING DIAGRAM

Refer to SFI system DTC P061512 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Drive the vehicle for 20 seconds or more under the following conditions:
   - Engine speed is 1000 rpm or more.
   - Vehicle speed is 20 km/h (12.43 mph) or more.
2. Check for DTCs again INFO .

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (STARTER SW)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

Transmission

TECHSTREAM DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Starter SW	Starter signal/ ON or OFF	ON: Starter operating OFF: Starter not operating	-

(e) Check the value displayed on the Techstream when the vehicle is driven at 20 km/h (12.43 mph) or more.

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

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CONDITION	STARTER SW	PROCEED TO
Driving at 20 km/h (12.43 mph) or more	OFF	A
	ON	B

B ▶ **GO TO STEP 2**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

2.	INSPECT PARK/NEUTRAL POSITION SWITCH

(a) Inspect the park/neutral position switch INFO .

NG ▶ **REPLACE PARK / NEUTRAL POSITION SWITCH**

OK
▼

3.	REPAIR OR REPLACE HARNESS OR CONNECTOR (STA SIGNAL CIRCUIT)

(a) Repair or replace harness or connector (STA signal circuit).

NEXT
▼

4.	CHECK WHETHER DTC OUTPUT RECURS (DTC P061512)

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Clear the DTCs INFO .

(e) Turn the Ignition switch off and wait for at least 30 seconds.

(f) Turn the Ignition switch ON and turn the Techstream on.

(g) Start the engine.

(h) Idle the engine for 5 seconds or more.

(i) Drive the vehicle at 24 km/h (15 mph) or more for 20 seconds or more.

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CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

(j) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(k) Read the DTCs using the Techstream.

Result:

RESULT	PROCEED TO
DTC P061512 is output	A
DTCs are not output	B

B ▶ **END**

A ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000003Q3G075X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P062F44; Internal Control Module EEPROM Data Memory Failure; 2016 MY Tacoma [08/2015 -]		

DTC	**P062F44**	**Internal Control Module EEPROM Data Memory Failure**

DESCRIPTION

The ECM monitors its internal operation and it will set this DTC when it detects an internal malfunction.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P062F44	ECM internal error (EEPROM)	ECM	P062F

MONITOR DESCRIPTION

The ECM monitors its internal operation. If the internal operation is malfunctioning, the ECM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P062F: Internal control module EEPROM error/ Functional
Required sensors/Components (Main)	ECM
Required sensors/Components (Related)	-
Frequency of operation	Once per driving cycle
Duration	10 times
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None

Case 1:

All of the following conditions are met	-
Permanent Fault Code	Not stored
OBDII system commands	Store
Battery voltage	8 V or higher

Case 2:

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All of the following conditions are met	-
Permanent Fault Code	Stored
OBDII system commands	Clear
Battery voltage	8 V or higher

Case 3:

Battery voltage	8 V or higher

TYPICAL MALFUNCTION THRESHOLDS

Case 1:

Either of the following conditions is met (2 data)	1 or 2
1. Either of the following conditions is met (10 times)	(a), (b) or (c)
(a) EEPROM communication timeout	Occurred
(b) Permanent Fault Code	Not stored
(c) Permanent Fault Code	Not equal to commanded Fault Code
2. Storing processing is more than 0.096 seconds	Not completed

Case 2:

Either of the following conditions is met (2 data)	1 or 2
1. Either of the following conditions is met (10 times)	(a) or (b)
(a) EEPROM communication timeout	Occurred
(b) Permanent Fault Code	Stored
2. Storing processing is more than 0.096 seconds	Not completed

Case 3:

Either of the following conditions is met (2 data)	1 or 2
1. Either of the following conditions is met (10 times)	(a) or (b)
(a) EEPROM communication timeout	Occurred
(b) Reading processing is more than 0.096 seconds	Not completed
2. Permanent Fault Code data (10 times)	Mismatch

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative

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(-) battery terminal notices before proceeding with work INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Check the battery voltage is 9.5 V or higher.
2. Turn the ignition switch ON.
3. Check for DTCs again INFO .

PROCEDURE

1.	**READ OUTPUT DTC (DTC P062F44)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear DTCs INFO .

(e) Turn the ignition switch off and turn the Techstream off.

(f) Disconnect the Techstream.

(g) Disconnect the cable from the negative (-) battery terminal and wait for 1 minute.

(h) Connect the cable to the negative (-) battery terminal.

(i) Connect the Techstream to the DLC3.

(j) Turn the ignition switch to ON.

(k) Turn the Techstream on.

(l) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(m) Read DTCs.

Result

RESULT	PROCEED TO
No DTC output	A
P062F44 is output	B

B ▶ **REPLACE ECM**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005V5X000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P070312; Brake Switch "B" Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P070312**	**Brake Switch "B" Circuit Short to Battery**

DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling while driving in lock-up when the brakes are suddenly applied.

When the brake pedal is depressed, this switch sends a signal to the ECM. Then the ECM cancels the operation of the lock-up clutch while braking is in progress.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P070312	Stop light switch remains on even when the vehicle is driven in a stop (less than 3 km/h (1.86 mph)) and go (30 km/h (18.65 mph) or more) pattern 5 times (2 trip detection logic).	• Short in stop light switch signal circuit • Stop light switch • ECM	P0724

MONITOR DESCRIPTION

This DTC indicates that the stop light switch remains on. When the stop light switch remains on during stop and go driving, the ECM interprets this as a fault in the stop light switch. Then the MIL illuminates and the ECM stores the DTC. The vehicle must stop (less than 3 km/h (1.86 mph)) and go (30 km/h (18.65 mph) or more) 5 times for 2 driving cycles in order for the DTC to be stored.

MONITOR STRATEGY

Related DTCs	P0724: Stop light switch/Verify switch input
Required sensors/Components	Stop light switch
Frequency of operation	Continuous
Duration	GO and STOP 5 times
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The stop light switch remains on during GO and STOP 5 times.

GO and STOP are defined as follows:

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The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
GO: Vehicle speed	30 km/h (18.65 mph) or more
STOP: Vehicle speed	Less than 3 km/h (1.86 mph)

TYPICAL MALFUNCTION THRESHOLDS

Stop light switch	ON

WIRING DIAGRAM

Refer to SFI system DTC P05042B INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the following stop and go drive pattern 5 times:*1
    - Accelerate the vehicle to 30 km/h (18.65 mph) or more, depress the brake pedal and decelerate the vehicle to 3 km/h (1.86 mph) or less.
2. Turn the Ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)**

(a) Connect the Techstream to the DLC3.

(b) Turn the Ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) According to the display on the Techstream, read the Data List.

Transmission

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Stop Light Switch	Stop light switch status/ ON or OFF	• ON: Brake pedal depressed • OFF: Brake pedal released	-

Result:

RESULT	PROCEED TO
Data List value is normal	A
Data List value is not normal	B

B ▶ **GO TO STEP 2**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

2.	CHECK STOP LIGHT SWITCH ASSEMBLY INSTALLATION

(a) Check the stop light switch assembly installation INFO .

OK:
Stop light switch is installed correctly.

NG ▶ **SECURELY REINSTALL STOP LIGHT SWITCH ASSEMBLY**

OK ▼

3.	CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - ECM)

(a) Disconnect the S10 stop light switch assembly connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
S10-1 or E13-16 (STP) - Other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

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OK

4.	**CHECK STOP LIGHT SWITCH ASSEMBLY**

(a) Check the stop light switch assembly INFO .

NG ▶ **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8417MX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P070513,P070562; Transmission Range Sensor "A" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P070513**	**Transmission Range Sensor "A" Circuit Open**

DTC	**P070562**	**Transmission Range Sensor "A" Signal Compare Failure**

DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P070513	All of the following signals are OFF simultaneously for 60 seconds or more (2 trip detection logic): • NSW input signal • P input signal • R input signal • N input signal • D input signal	• Open or short in park/neutral position switch circuit • Park/neutral position switch • ECM	P0705
P070562	Any 2 or more of the following signals are ON simultaneously for 2 seconds or more (2 trip detection logic): • One of the following conditions is met. ○ P input signal is ON ○ N input signal is ON ○ NSW input signal is ON • R input signal • D input signal	• Open or short in park/neutral position switch circuit • Park/neutral position switch • ECM	P0705

MONITOR DESCRIPTION

This DTC indicates a problem with the park/neutral position switch and the wire harness in the park/neutral position switch circuit.

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

For safety, the park/neutral position switch detects the shift lever position so that the engine can be started only when the shift lever is in P or N.

The park/neutral position switch sends a signal to the ECM according to the shift lever position (P, R, N, D or S). The ECM determines that there is a problem with the switch or related parts if it receives more than 1 position signal simultaneously. The ECM will illuminate the MIL and store the DTC.

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MONITOR STRATEGY

Related DTCs	P0705: Park/neutral position switch/Verify switch input
Required sensors/Components	Park/neutral position switch
Frequency of operation	Continuous
Duration	P070513: 60 sec. P070562: 2 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not stored	None
Ignition switch	ON
Battery voltage	10.5 V or more
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

P070513:

All of the following conditions are met

P position switch	OFF
N position switch	OFF
Park/neutral position switch (NSW)	OFF
R position switch	OFF
D position switch	OFF

P070562:

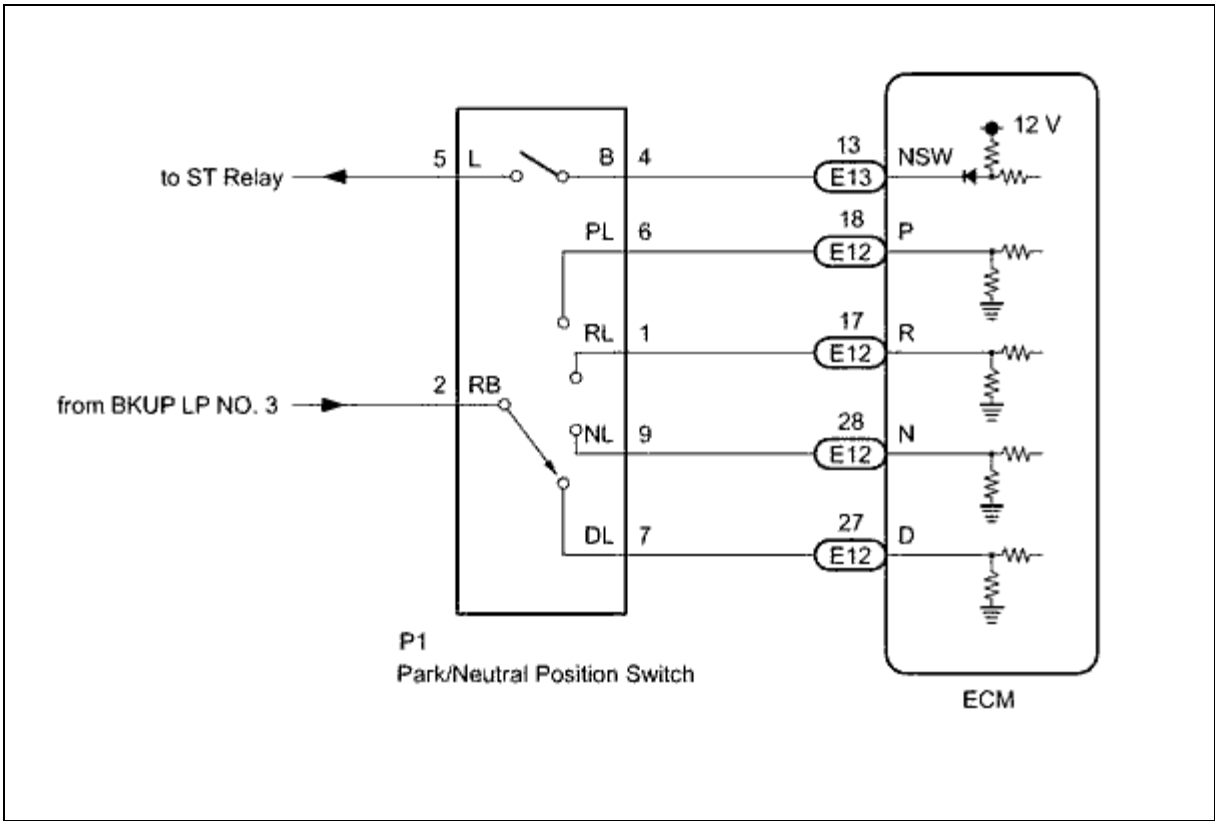
Any two of the following conditions are met:	Conditions 1, 2 and 3
1. One of the following conditions is met:	Conditions (a), (b) or (c)
(a). P position switch	ON
(b). Park/neutral position switch (NSW)	ON
(c). N position switch	ON
2. R position switch	ON
3. D position switch	ON

COMPONENT OPERATING RANGE

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Park/neutral position switch	The park/neutral position switch sends only one signal to the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the ignition switch to ON.*1
2. Wait with the shift lever in each position (P, R, N and D) for 60 seconds or more.*2
3. Turn the ignition switch off.
4. Perform steps (*1) through (*2) again.
5. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely

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on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

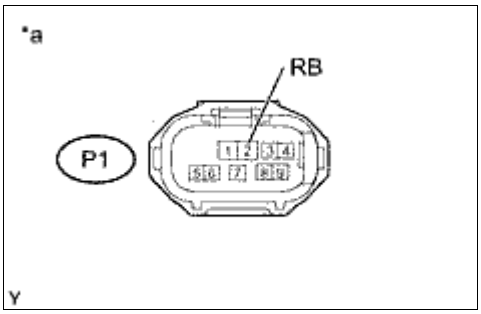
TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Neutral Position SW	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P • OFF: Shift lever not in P	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in R	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.

PROCEDURE

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1.	**CHECK HARNESS AND CONNECTOR (BATTERY - PARK/NEUTRAL POSITION SWITCH)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-2 (RB) - Body ground	Ignition switch ON	11 to 14 V
P1-2 (RB) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

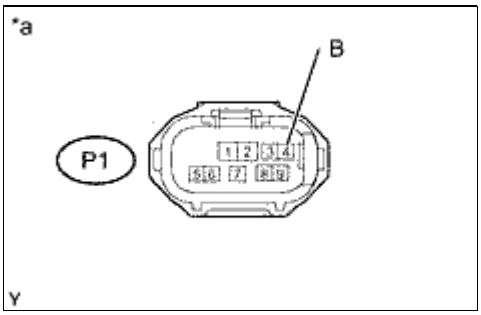
*a	Front view of wire harness connector (to Park/Neutral Position Switch)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

2.	**CHECK HARNESS AND CONNECTOR (NSW TERMINAL VOLTAGE)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

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TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-4 (B) - Body ground	Ignition switch ON	11 to 14 V
P1-4 (B) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

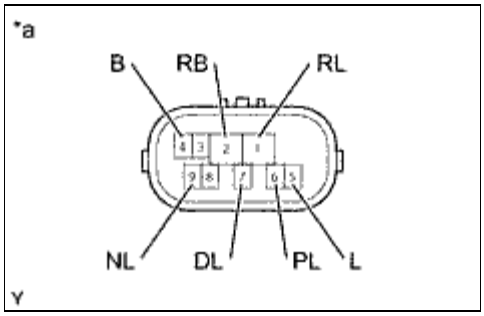
*a	Front view of wire harness connector (to Park/Neutral Position Switch)

NG ▶ **GO TO STEP 5**

OK
▼

3.	**INSPECT PARK/NEUTRAL POSITION SWITCH**

(a) Disconnect the P1 park/neutral position switch connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (B) - 5 (L)	Shift lever in P or N	Below 1 Ω
2 (RB) - 6 (PL)	Shift lever in P	Below 1 Ω
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
2 (RB) - 9 (NL)	Shift lever in N	Below 1 Ω
2 (RB) - 7 (DL)	Shift lever in D, S, "+" or "-"	Below 1 Ω
4 (B) - 5 (L)	Shift lever not in P or N	10 kΩ or higher
2 (RB) - 6 (PL)	Shift lever not in P	10 kΩ or higher
2 (RB) - 1 (RL)	Shift lever not in R	10 kΩ or higher
2 (RB) - 9 (NL)	Shift lever not in N	10 kΩ or higher
2 (RB) - 7 (DL)	Shift lever not in D, S, "+" or "-"	10 kΩ or higher

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Text in Illustration

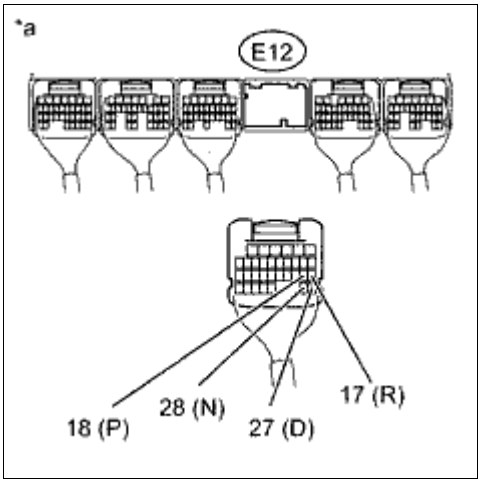
*a	Component without harness connected (Park/Neutral Position Switch)

NG ▶ **REPLACE PARK/NEUTRAL POSITION SWITCH**

OK
▼

4.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)**

(a) Disconnect the ECM connector.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-18 (P) - Body ground	• Ignition switch ON • Shift lever in P	11 to 14 V
E12-17 (R) - Body ground	• Ignition switch ON • Shift lever in R	11 to 14 V*
E12-28 (N) - Body ground	• Ignition switch ON • Shift lever in N	11 to 14 V
E12-27 (D) - Body ground	• Ignition switch ON • Shift lever in D, S, "+" or "-"	11 to 14 V

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-18 (P) - Body ground	• Ignition switch ON • Shift lever not in P	Below 1 V
E12-17 (R) - Body ground	• Ignition switch ON • Shift lever not in R	Below 1 V
E12-28 (N) - Body ground	• Ignition switch ON • Shift lever not in N	Below 1 V
E12-27 (D) - Body ground	• Ignition switch ON • Shift lever not in D, S, "+" or "-"	Below 1 V

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

HINT:

*: The voltage will drop slightly due to lighting up of the backup light.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

5.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)**

(a) Disconnect the P1 park/neutral position switch connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P1-4 (B) - E13-13 (NSW)	Always	Below 1 Ω
P1-4 (B) or E13-13 (NSW) - Body ground and other terminals	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W7Z0SJX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071000; Transmission Fluid Temperature Sensor "A" Circuit Range/Performance; 2016 MY Tacoma [08/2015 -]		

DTC	**P071000**	**Transmission Fluid Temperature Sensor "A" Circuit Range/Performance**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071000	Either condition is met: (2 trip detection logic) • (a) Certain monitor enabling conditions are met and the No. 1 ATF temperature is below 20°C (68°F) • (b) Certain monitor enabling conditions are met and the No. 1 ATF temperature is 110°C (230°F) or higher	No. 1 ATF temperature sensor (transmission wire)	P0711

MONITOR DESCRIPTION

This DTC indicates that there is a problem with output signals from the No. 1 ATF temperature sensor and that the sensor itself is defective. The No. 1 ATF temperature sensor converts the ATF temperature into an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit or a fault of the No. 1 ATF temperature sensor.

After running the vehicle for a certain period, the ATF temperature should increase. If the ATF temperature is below 20°C (68°F) after running the vehicle for a certain period, the ECM interprets this as a malfunction, illuminates the MIL and stores the DTC.

When the ATF temperature is 110°C (230°F) or higher and the engine coolant temperature takes 10 seconds or more to reach 60°C (140°F) after a cold start, the ECM also determines this as a malfunction, illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0711: ATF temperature sensor/Rationality check
Required sensors/Components	ATF temperature sensor (TFT sensor)

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Frequency of operation	Continuous
Duration	Condition (A), (B), (C) and (D): 3 sec. Condition (E): Continuous
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0112, P0113 (IAT (Intake air temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system) P2610 (Soak timer circuit)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
IAT (Intake air temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Soak timer circuit	Not circuit malfunction

Condition (A):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	10 min. or more
Accumulated driving time*1	100 sec. or more
Driving distance after engine start*3	4.9 km (3.04 miles) or more
IAT*4	15°C (59°F) or higher
ECT (12 sec. after engine start)	15°C (59°F) or higher
Soak time	5 hours or more

Condition (B):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	21 min. and 40 sec. or more
Accumulated driving time*1	200 sec. or more
Driving distance after engine start*3	9 km (5.6 miles) or more
IAT*4	-10°C (14°F) or higher
ECT (12 sec. after engine start)	-10°C (14°F) or higher

Condition (C):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	30 min. or more
Accumulated driving time*1	400 sec. or more
Driving distance after engine start*3	16 km (9.9 miles) or more
IAT*4	-15°C (5°F) or higher
ECT (12 sec. after engine start)	-15°C (5°F) or higher

Condition (D):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	55 min. or more
Accumulated driving time*1	750 sec. or more
Driving distance after engine start*3	27 km (16.8 miles) or more

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Condition (E):

Time after ECT reaches 60°C (140°F)	10 sec. or more
ATF temperature (12 sec. after engine start)	110°C (230°F) or higher
ECT (12 sec. after engine start)	Below 35°C (95°F)

HINT:

*1: Following conditions are met

Engine speed - Turbine speed	50 rpm or more
Output speed	400 rpm or more
Throttle valve opening angle	3% or more
Shift position	Not "N" or "P"
Engine	Running
However, accumulated driving time is cleared	-
When following condition met	-
Duration time from shifting to "N" or "P"	300 sec. or more

*2: Time after engine start is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*3: Driving distance is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*4: IAT is measured when either of following conditions met

12 sec. after engine start	-
Duration time from shifting to "N" or "P"	300 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

When either condition below is met: Condition (A), (B), (C) and (D) or (E)

Condition (A), (B), (C) and (D):

ATF temperature	Below 20°C (68°F)

Condition (E):

ATF temperature	110°C (230°F) or higher

COMPONENT OPERATING RANGE

ATF temperature	20°C (68°F) or higher, and Below 110°C (230°F)

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.*1
2. Drive the vehicle 27 km (16.8 miles) or more over a period of 12 minutes and 30 seconds or more.*2
3. After 55 minutes or more have elapsed since performing step (*1), turn the ignition switch off.*3
4. Perform steps (*1) through (*3) again.
5. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P071011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P071015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

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TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

If a circuit related to the No. 1 ATF temperature sensor becomes open, P071015 is immediately stored (in 0.5 seconds). When P071015 is stored, P071000 cannot be stored.

It is not necessary to inspect the circuit when P071000 is stored.

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P071000)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P071000 is output	A
P071000 and other DTCs are output	B

HINT:

If any other codes besides P071000 are output, perform troubleshooting for those DTCs first.

B ▶ **GO TO DTC CHART**

A ▼

2.	**CHECK TRANSMISSION FLUID LEVEL**

(a) Check the transmission fluid level INFO .

OK:

Automatic transmission fluid level is correct.

NG ▶ **ADJUST FLUID LEVEL**

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OK ▶ REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W850TZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071011; Transmission Fluid Temperature Sensor "A" Circuit Short To Ground; 2016 MY Tacoma [08/2015 -]		

DTC	**P071011**	**Transmission Fluid Temperature Sensor "A" Circuit Short To Ground**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071011	The output voltage from the No. 1 ATF temperature sensor is below 0.142 V for 0.5 seconds or more (1 trip detection logic).	• Short in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM	P0712

MONITOR DESCRIPTION

The No. 1 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects a short in the No. 1 ATF temperature sensor circuit. If the resistance value of the No. 1 ATF temperature sensor is below 79 Ω*, the ECM interprets this as a fault in the No. 1 ATF temperature sensor or wiring. The ECM will illuminate the MIL and store the DTC.

*: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

MONITOR STRATEGY

Related DTCs	P0712: ATF temperature sensor/Range check (Low voltage)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately

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Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not stored	None
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

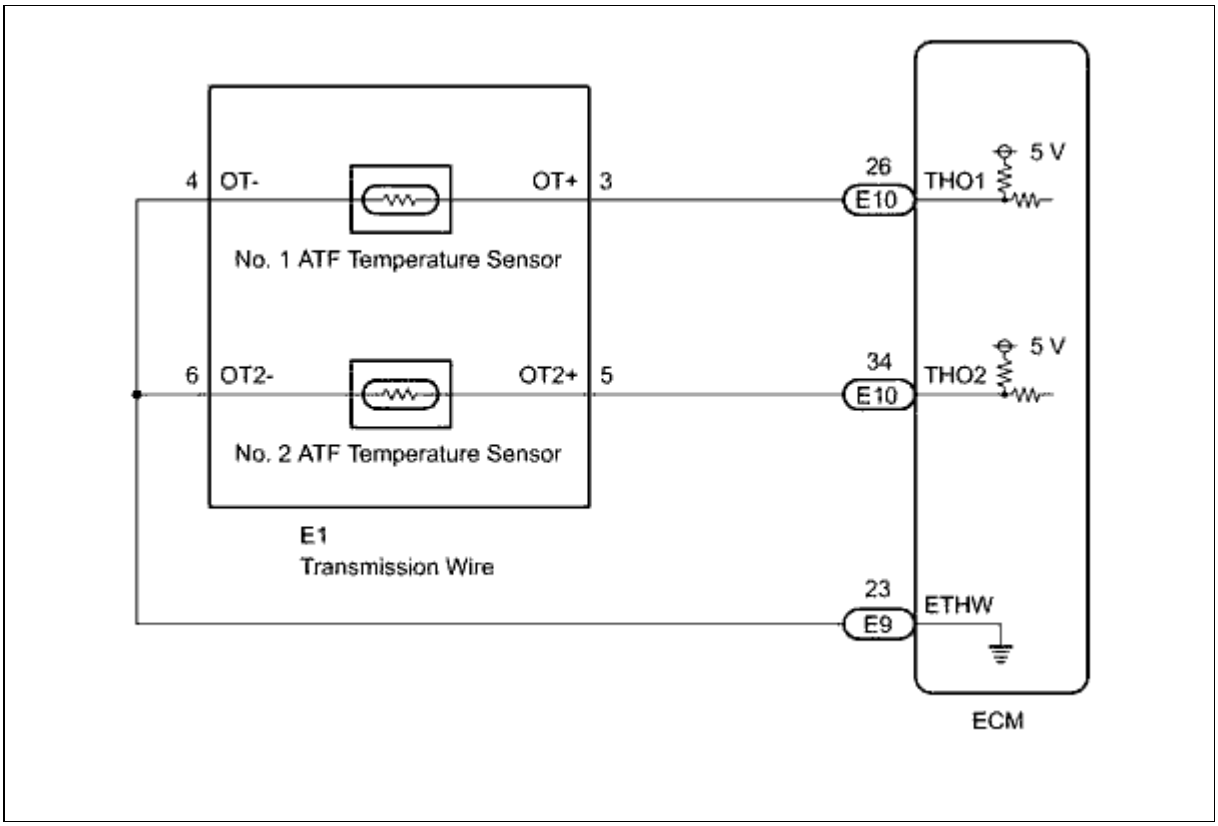
TYPICAL MALFUNCTION THRESHOLDS

ATF temperature sensor voltage (ATF temperature)	Below 0.142 V (Higher than 164°C (327°F))

COMPONENT OPERATING RANGE

ATF temperature sensor voltage (ATF temperature)	0.142 V or higher, and 4.915 V or less (-48°C (-54°F) or higher, and 164°C (327°F) or less)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 3 seconds or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P071011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P071015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

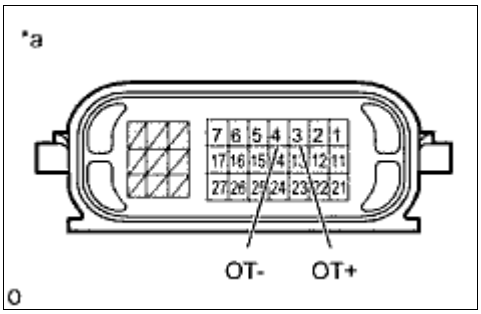
TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

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PROCEDURE

1.	**INSPECT NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
3 (OT+) or 4 (OT-) - Body ground and other terminals	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

*a	Component without harness connected (Transmission Wire)

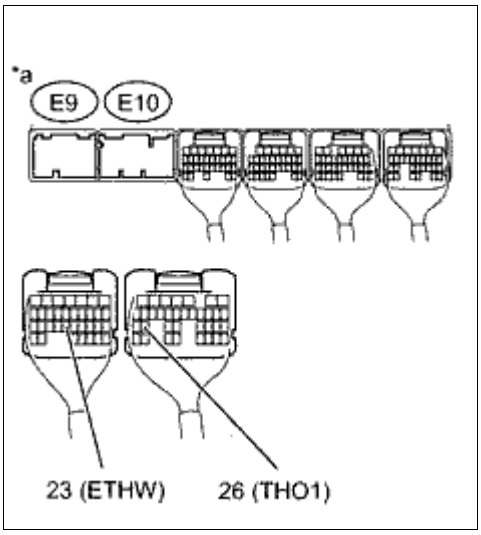
NG ▶ **REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-26 (THO1) - E9-23 (ETHW)	Always	79 Ω to 156 kΩ
E10-26 (THO1) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W850U0X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071015; Transmission Fluid Temperature Sensor "A" Circuit Short to Battery or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P071015**	**Transmission Fluid Temperature Sensor "A" Circuit Short to Battery or Open**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071015	The output voltage from the No. 1 ATF temperature sensor is higher than 4.915 V for 0.5 seconds or more and either condition is met (1 trip detection logic): (A) 10 minutes or more have elapsed after the engine start when the engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 seconds or more have elapsed after the engine start when the engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open or short in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM	P0713

MONITOR DESCRIPTION

The No. 1 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit. If the resistance value of the No. 1 ATF temperature sensor is higher than 156 kΩ*, the ECM interprets this as a fault in the No. 1 ATF temperature sensor or wiring. The ECM will illuminate the MIL and store the DTC.

*: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

MONITOR STRATEGY

Related DTCs	P0713: ATF temperature sensor/Range check (High voltage)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous

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Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not stored.	P0117, P0118 (ECT (Engine coolant temperature) sensor circuit fail) P0112, P0113 (IAT (Intake air temperature) sensor circuit fail)
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF
ECT (Engine coolant temperature) sensor circuit fail (P0117, P0118)	Not detected
IAT (Intake air temperature) sensor circuit fail (P0112, P0113)	Not detected

Either condition is met: Condition (A) or (B)

Condition (A):

Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	-29.375°C (-20.875°F) or less
Time after engine start	600 sec. or more

Condition (B):

Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	Higher than -29.375°C (-20.875°F)
Time after engine start	10 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

ATF temperature sensor voltage (ATF temperature)	Higher than 4.915 V (Below -48°C (-54°F))

COMPONENT OPERATING RANGE

ATF temperature sensor voltage (ATF temperature)	0.142 V or higher, and 4.915 V or less (-48°C (-54°F) or higher, and 164°C (327°F) or less)

WIRING DIAGRAM

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Refer to DTC P071011 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 10 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P0712 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P0713 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

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TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

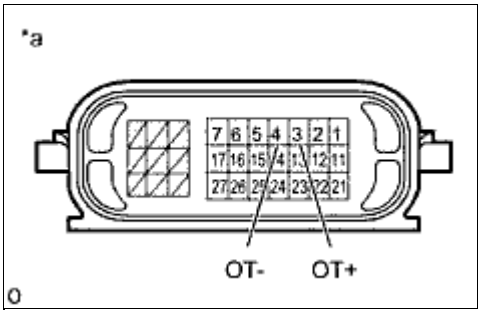
If the circuit related to the No. 1 ATF temperature sensor becomes open, P071015 is immediately stored (in 0.5 seconds). When P071015 is stored, P071000 cannot be stored.

It is not necessary to inspect the circuit when P071000 is stored.

PROCEDURE

1.	**INSPECT NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
3 (OT+) or 4 (OT-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 1 ATF TEMPERATURE SENSOR**

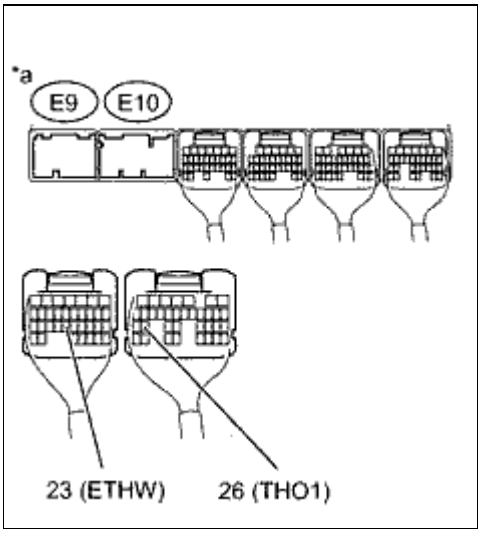
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(TRANSMISSION WIRE)

OK

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connectors.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-26 (THO1) - E9-23 (ETHW)	Always	79 Ω to 156 kΩ

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000025K005JX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P071512,P071514,P071531; Input/Turbine Speed Sensor "A" Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P071512**	**Input/Turbine Speed Sensor "A" Circuit Short to Battery**

DTC	**P071514**	**Input/Turbine Speed Sensor "A" Circuit Short to Ground or Open**

DTC	**P071531**	**Input/Turbine Speed Sensor "A" No Signal**

DESCRIPTION

This sensor detects the rotation speed of the turbine which shows the input turbine speed of the transmission. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P071512	When the transmission revolution sensor (NT) input voltage is higher than 1.9 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM	P07C0
P071514	When the transmission revolution sensor (NT) input voltage is below 0.1 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM	P07BF
P071531	Both of the following conditions (A) and (B) are met for 5 seconds or more (1 trip detection logic): (A) Either of the following conditions (a) and (b) are met (a) All of the following conditions are met: • Output shaft speed is 1000 rpm or more. • Park/neutral position switch D input signal is ON. • Gear position is 2nd, 3rd, 4th, 5th or 6th. • The vehicle speed is 25 km/h (15.54 mph) or more. (b) All of the following conditions are met:	• Harness or connector • Transmission revolution sensor (NT) • ECM	P0717

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DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
	• Vehicle speed at output speed sensor is 8.99 km/h (5.59 mph) or more. • Park/neutral position switch D input signal is ON. • Either of the following conditions (aa) or (bb) is met (aa) Gear position is 1st and transmission revolution sensor (NT) is 1310 rpm or more (bb) Gear position is 2nd, 3rd, 4th, 5th or 6th and transmission revolution sensor (NT) is 760 rpm or more (B) Transmission revolution sensor (NT) value is less than 300 rpm.		

MONITOR DESCRIPTION

The transmission revolution sensor (NT) detects the transmission input shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

While the vehicle is operating in 2nd, 3rd, 4th, 5th or 6th gear with the shift lever in D, if the input shaft speed is less than 300 rpm*1 and the output shaft speed is more than 1000 rpm*2, the ECM interprets this as a fault, illuminates the MIL and stores the DTC.

*1: Pulse is not output or is irregularly output.

*2: The vehicle speed is 25 km/h (15.54 mph) or more.

MONITOR STRATEGY

Related DTCs	P07BF: Transmission revolution sensor (NT)/Range check (Low voltage) P07C0: Transmission revolution sensor (NT)/Range check (High voltage) P0717: Transmission revolution sensor (NT)/Verify pulse input
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P07BF and P07C0: 4.5 sec. P0717: 5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

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P07BF and P07C0:

Turbine speed sensor pulse input fail (P0717)	Not detected

P0717: Verify pulse input

Either condition is met: Condition (A) or (B)

Condition (A):

Output shaft revolution	1000 rpm or more
Vehicle speed	25 km/h (15.54 mph) or more
Shift change	Shift change is completed before starting next shift change operation
ECM selected gear	Not 1st
Park/neutral position switch (NSW)	OFF
R position switch	OFF
D position switch	ON
Engine	Running
Turbine speed sensor range check fail (P07BF, P07C0)	Not detected
Pressure Control Solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected

Condition (B):

Vehicle speed at output speed sensor	8.99 km/h (5.59 mph) or more
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
D position switch	ON
Park/neutral position switch (NSW)	OFF
Engine	Running
Pressure control solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more
2. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

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P07C0:

Turbine speed sensor voltage	Higher than 1.9 V

P07BF:

Turbine speed sensor voltage	Below 0.1 V

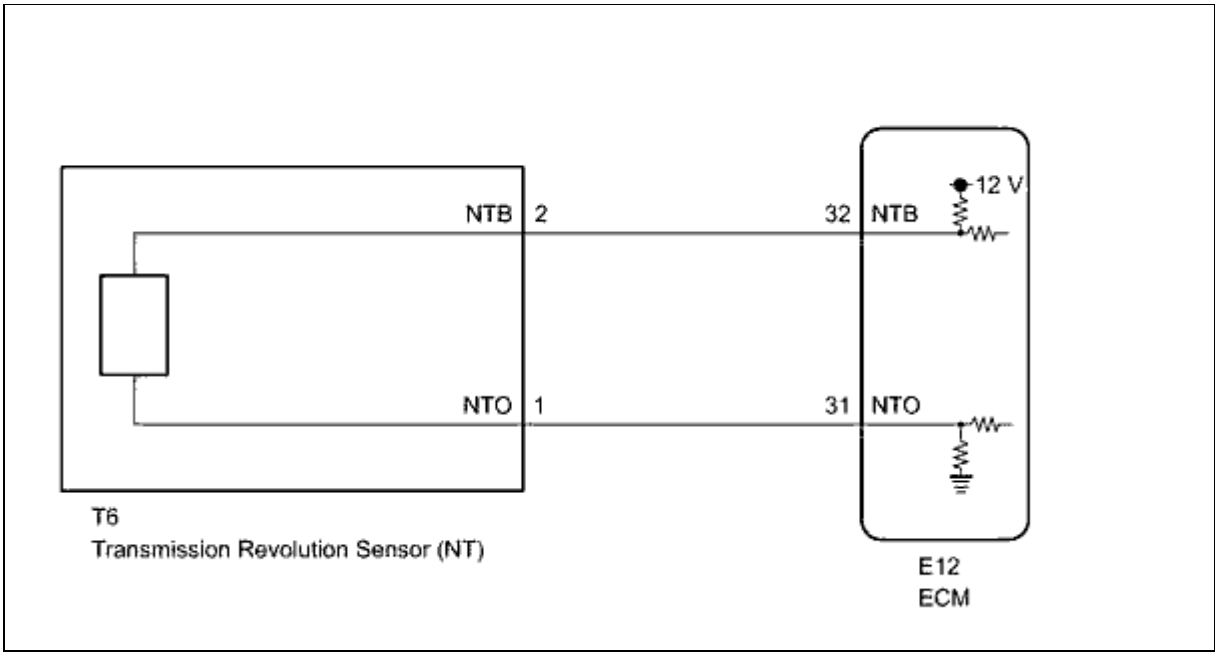
P0717 Condition (A) and (B):

Turbine speed sensor revolution	Less than 300 rpm

COMPONENT OPERATING RANGE

Transmission revolution sensor (NT)	Turbine speed is equal to engine speed with lock-up ON

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test and drive the vehicle for 5 seconds or more at 25 km/h (15.54 mph) or more INFO .
2. Check for DTCs again INFO .

1. DATA LIST

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HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
NT Sensor Speed	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm

HINT:

- NT Sensor Speed is always 0 while driving: Open or short in the sensor or circuit.
- NT Sensor Speed is always more than 0 and less than 300 rpm while driving the vehicle at 25 km/h (15.54 mph) or more: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (NT SENSOR SPEED AND NT SENSOR VOLTAGE)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Transmission

TESTER	MEASUREMENT	NORMAL CONDITION	DIAGNOSTIC NOTE

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DISPLAY	ITEM/RANGE		
NT Sensor Speed	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

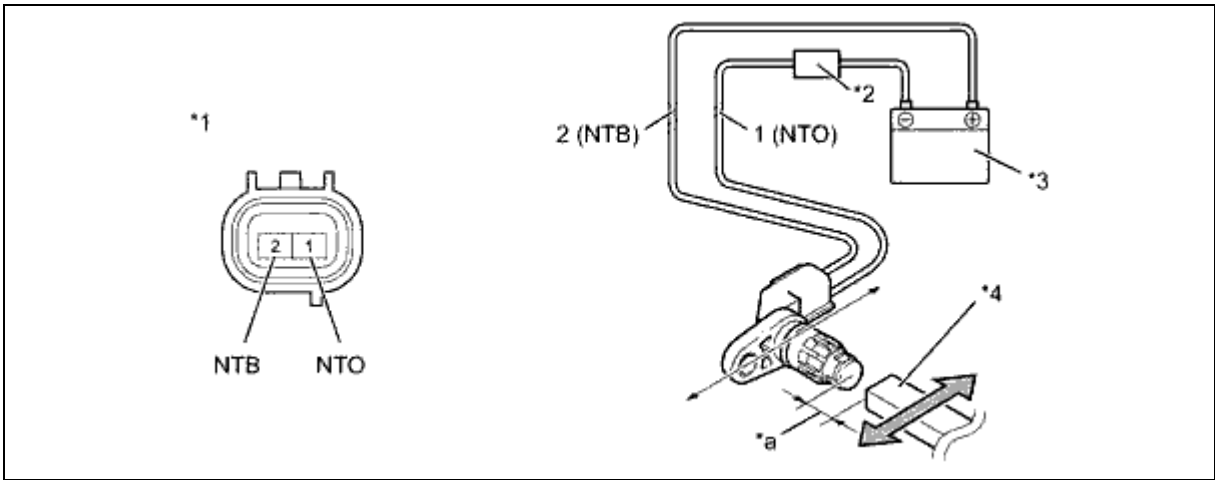
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (NT)**

(a) Remove the transmission revolution sensor (NT) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (NT)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (NT) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (NTO) - 2 (NTB)	Low signal	4 to 8 mA
1 (NTO) - 2 (NTB)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (NT)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (NT) - ECM)**

(a) Disconnect the T6 transmission revolution sensor (NT) connector.

(b) Disconnect the E12 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T6-2 (NTB) - E12-32 (NTB)	Always	Below 1 Ω
T6-1 (NTO) - E12-31 (NTO)	Always	Below 1 Ω
T6-2 (NTB) - Body ground	Always	10 kΩ or higher
T6-1 (NTO) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000003UR201YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P072012,P072014,P072031; Output Speed Sensor Circuit Short to Battery; 2016 MY Tacoma [08/2015 -]		

DTC	**P072012**	**Output Speed Sensor Circuit Short to Battery**

DTC	**P072014**	**Output Speed Sensor Circuit Short to Ground or Open**

DTC	**P072031**	**Output Speed Sensor No Signal**

DESCRIPTION

This sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P072012	When the transmission revolution sensor (SP2) input voltage is higher than 1.9 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2) • ECM	P077D
P072014	When the transmission revolution sensor (SP2) input voltage is below 0.1 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2) • ECM	P077C
P072031	All conditions are met for 5 seconds or more (1 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Either condition is met. • Gear position is 1st: Transmission revolution sensor (NT) value is 1310 rpm or more. • Gear position is 2nd, 3rd, 4th, 5th or 6th: Transmission revolution sensor (NT) value is more than 760 rpm or more. (c) The vehicle speed is 8.99 km/h (5.6 mph) or more. (d) No signal from transmission revolution sensor (SP2) is	• Harness or connector • Transmission revolution sensor (SP2) • ECM	P0722

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DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
	input to the ECM.		

MONITOR DESCRIPTION

The transmission revolution sensor (SP2) detects the transmission output shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

If the ECM detects no signal from the transmission revolution sensor (SP2) even while the vehicle is moving, it will conclude that there is a malfunction in the transmission revolution sensor (SP2). The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0722: Transmission revolution sensor (SP2)/Verify pulse input P077C: Transmission revolution sensor (SP2)/Range check (Low voltage) P077D: Transmission revolution sensor (SP2)/Range check (High voltage)
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P0722: 5 sec. P077C, P077D: 4.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

P0722:

Vehicle speed	8.99 km/h (5.59 mph) or more
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
D position switch	ON
Park/neutral position switch (NSW)	OFF
Engine	Running
Output speed sensor range check fail (P077C, P077D)	Not detected

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Pressure control solenoid circuit fail (P0748, P0778, P0798, P2716, P2810)	Not detected
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more
2. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more

P077C and P077D:

Output speed sensor pulse input fail (P0722)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0722:

Output shaft speed sensor signal	No signal

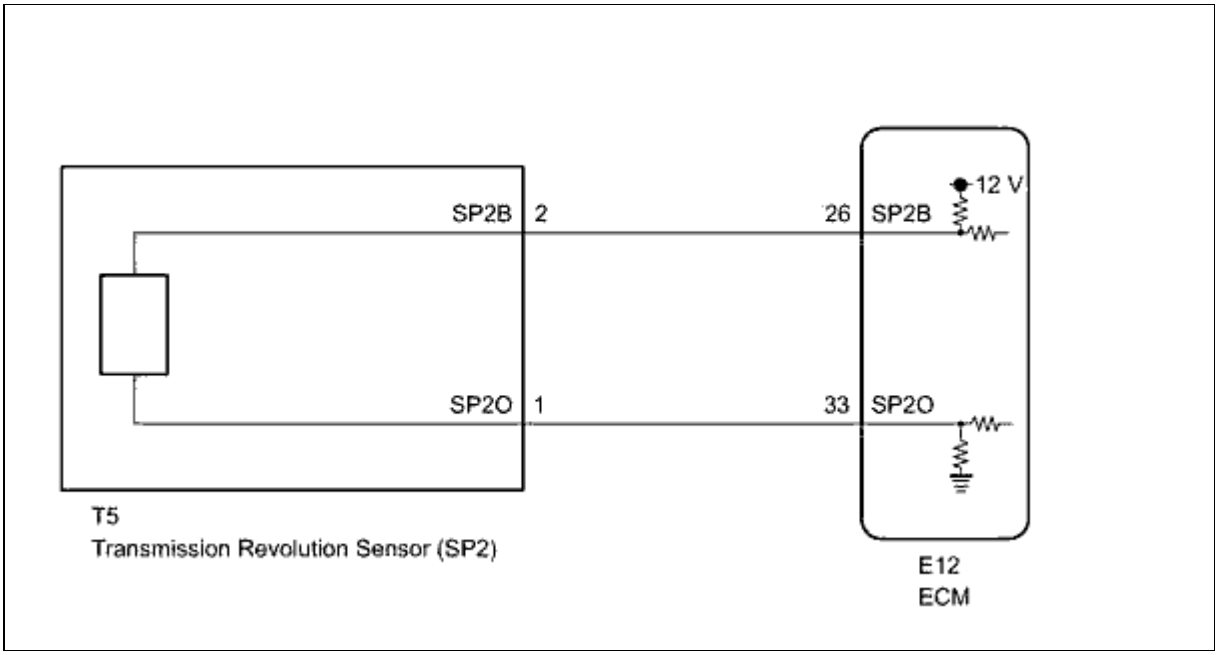
P077C:

Intermediate shaft speed sensor voltage	Below 0.1 V

P077D:

Intermediate shaft speed sensor voltage	Higher than 1.9 V

WIRING DIAGRAM



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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Speed (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-

HINT:

- Speed (SP2) is always 0 while driving: Open or short in the sensor or circuit.
- Speed (SP2) value displayed on the Techstream is much lower than the actual vehicle speed: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPEED (SP2) AND SP2 SENSOR VOLTAGE)**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Speed (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-
SP2 Sensor Voltage	Transmission revolution sensor (SP2) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

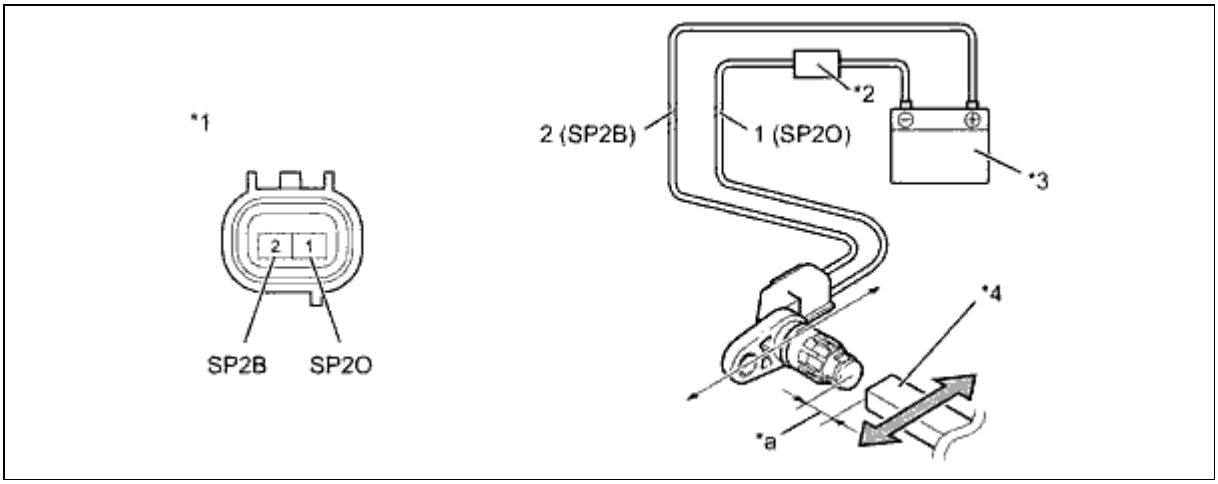
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (SP2)**

(a) Remove the transmission revolution sensor (SP2) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (SP2)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (SP2) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SP2O) - 2 (SP2B)	Low signal	4 to 8 mA
1 (SP2O) - 2 (SP2B)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (SP2)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (SP2) - ECM)**

(a) Disconnect the T5 transmission revolution sensor (SP2) connector.

(b) Disconnect the E12 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T5-2 (SP2B) - E12-26 (SP2B)	Always	Below 1 Ω
T5-1 (SP2O) - E12-33 (SP2O)	Always	Below 1 Ω
T5-2 (SP2B) - Body ground	Always	10 kΩ or higher
T5-1 (SP2O) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001IYS05UX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P074011; Torque Converter Clutch Circuit Short to Ground; 2016 MY Tacoma [08/2015 -]		

DTC	**P074011**	**Torque Converter Clutch Circuit Short to Ground**

DESCRIPTION

Shift solenoid valve SL is turned on and off by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P074011	The shift solenoid valve SL terminal voltage level is low, when the shift solenoid valve SL is operated (2 trip detection logic).	• Short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	P2769

Fail-safe function:

If the ECM detects a malfunction, it turns shift solenoid valve SL off.

MONITOR DESCRIPTION

Based on the signals from the throttle position sensor, the air flow meter and the crankshaft position sensor, the ECM sends a signal to shift solenoid valve SL to regulate the hydraulic pressure and provide smoother torque converter engagement. Shift solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform the torque-converter lock-up function. If the ECM detects a in the shift solenoid valve SL circuit, it will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2769: Shift solenoid valve SL/Range check
Required sensors/Components	Shift solenoid valve SL
Frequency of operation	Continuous
Duration	1 time
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None

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Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
Command to shift solenoid valve SL	ON
Time after command to solenoid OFF to ON	More than 0.008192 sec.

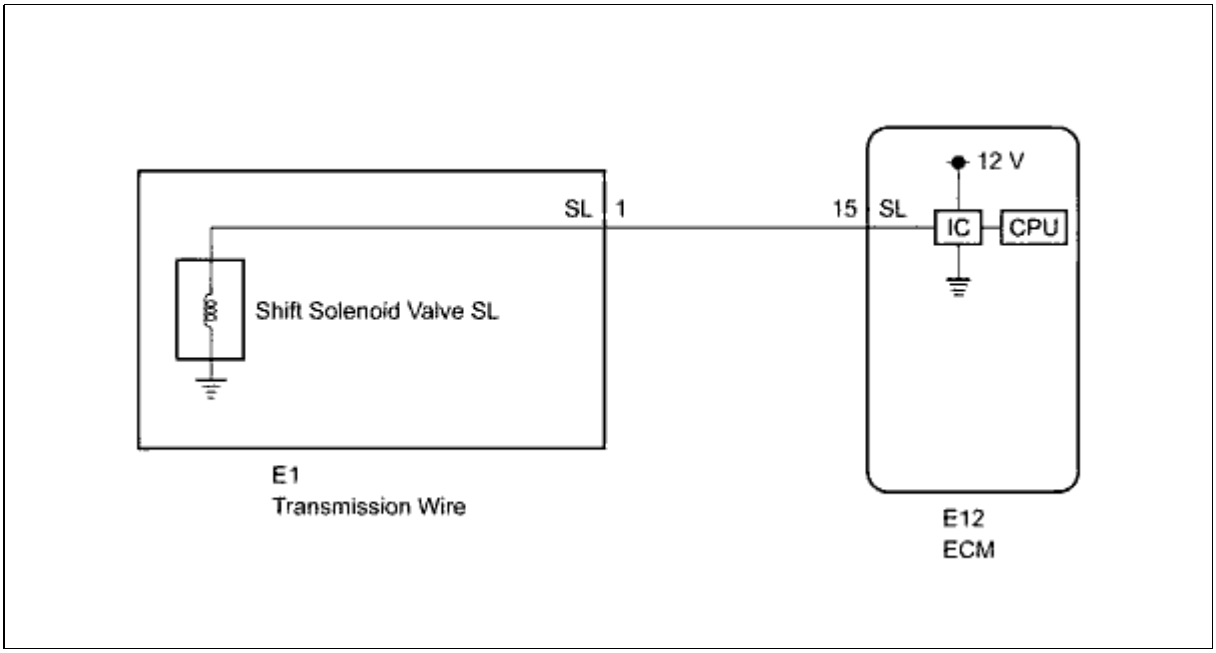
TYPICAL MALFUNCTION THRESHOLDS

Solenoid terminal voltage level	Low

COMPONENT OPERATING RANGE

Solenoid terminal voltage level	High

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

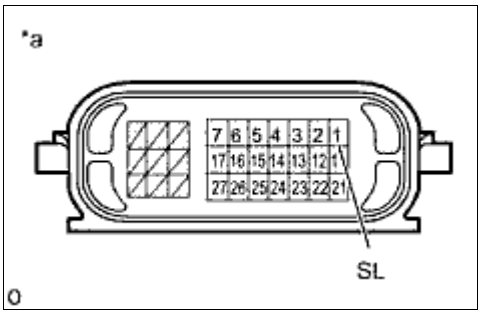
1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

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PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Component without harness connected (Transmission Wire)

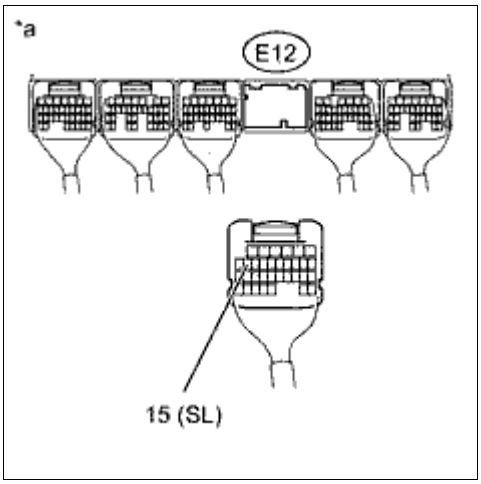
NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-15 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

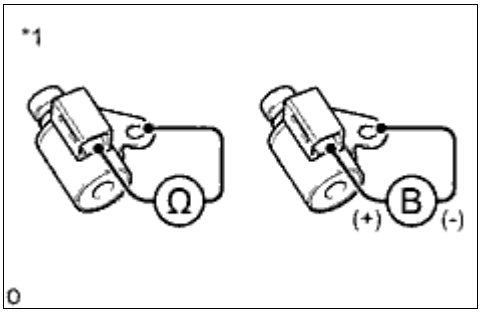
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL**

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

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(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001IYS05VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P074015; Torque Converter Clutch Circuit Short to Battery or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P074015**	**Torque Converter Clutch Circuit Short to Battery or Open**

DESCRIPTION

Shift solenoid valve SL is turned on and off by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P074015	The shift solenoid valve SL terminal voltage level is high, when the shift solenoid valve SL is not operated (2 trip detection logic).	• Open or short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	P2770

Fail-safe function:

If the ECM detects a malfunction, it turns shift solenoid valve SL off.

MONITOR DESCRIPTION

Based on the signals from the throttle position sensor, the air flow meter and the crankshaft position sensor, the ECM sends a signal to shift solenoid valve SL to regulate the hydraulic pressure and provide smoother torque converter engagement. Shift solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform the torque-converter lock-up function. If the ECM detects an open or short in the shift solenoid valve SL circuit, it will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2770: Shift solenoid valve SL/Range check
Required sensors/Components	Shift solenoid valve SL
Frequency of operation	Continuous
Duration	1 time
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON

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Starter	OFF
Command to shift solenoid valve SL	OFF
Time after command to solenoid OFF to ON	More than 0.008192 sec.

TYPICAL MALFUNCTION THRESHOLDS

Solenoid terminal voltage level	High

COMPONENT OPERATING RANGE

Solenoid terminal voltage level	Low

WIRING DIAGRAM

Refer to DTC P074011 INFO

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

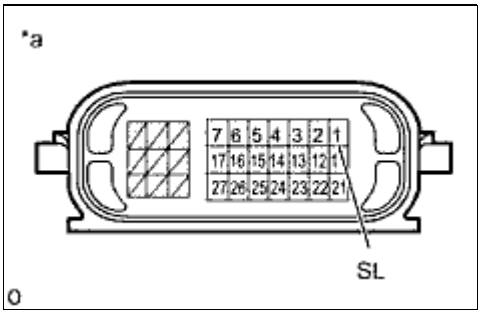
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

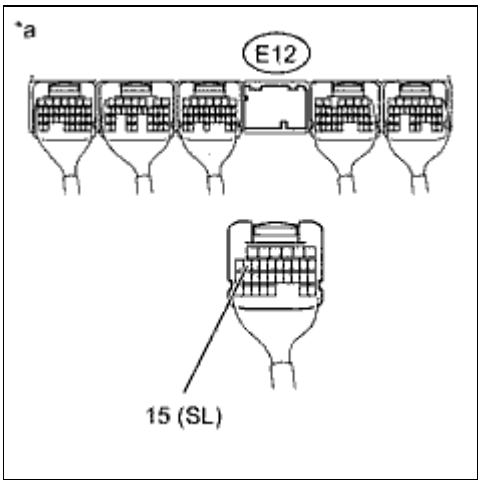
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-15 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

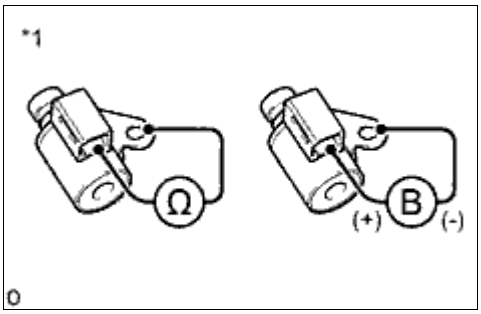
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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3.	INSPECT SHIFT SOLENOID VALVE SL

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000027R705TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07407F; Torque Converter Clutch Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07407F**	**Torque Converter Clutch Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses signals from the throttle position sensor, mass air flow meter, transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor to help determine the engagement timing of the lock-up clutch. The ECM monitors the engagement of the clutch using the transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SL, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07407F	Lock-up does not occur when requested (2 trip detection logic).	• Shift solenoid valve SL remains closed • Transmission wire • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear etc.) • Line pressure is too low	P0741

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature, and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SL. When shift solenoid valve SL is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SL or lock-up system performance. The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)

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- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P0741: Shift solenoid valve SL OFF malfunction
Required sensors/Components	Shift solenoid valve SL, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE), Throttle position sensor (VPA1), Mass air flow meter (MAF), ATF temperature sensor (THO1), Engine coolant temperature sensor (ECT)
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction

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Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

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OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

| Engine Speed - Turbine speed |	70 rpm or more

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up Solenoid	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
			mph) or more

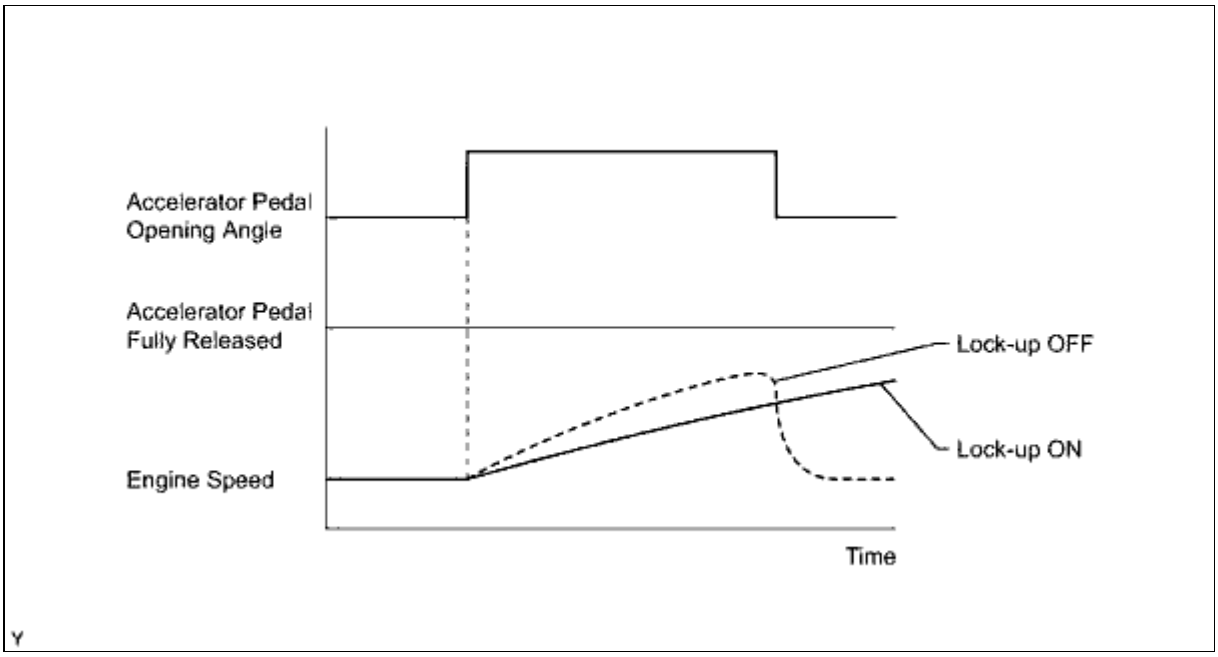
HINT:

This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)



PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07407F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07407F is output	A

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RESULT	PROCEED TO
P0741 and other DTCs are output	B

HINT:

If any other codes besides P07407F are output, perform the troubleshooting for those DTCs first.

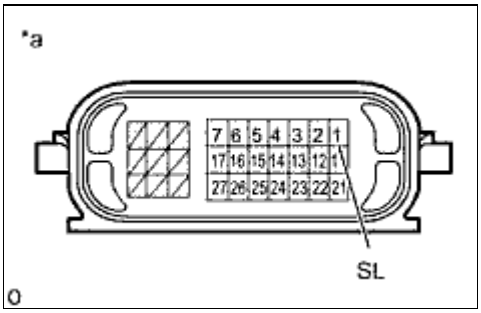
B ▶ **GO TO DTC CHART**

A

▼

2.	INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 6**

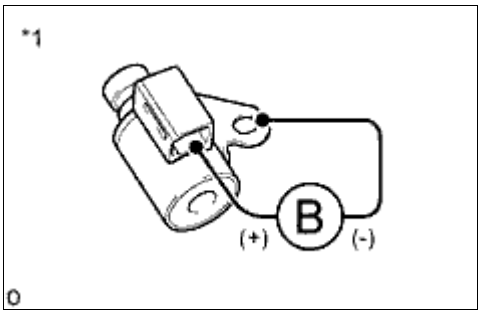
OK

▼

3.	INSPECT SHIFT SOLENOID VALVE SL (OPERATION)

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(a) Remove shift solenoid valve SL INFO .



(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

5.	**INSPECT TORQUE CONVERTER ASSEMBLY**

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(a) Check the torque converter assembly INFO .

OK:

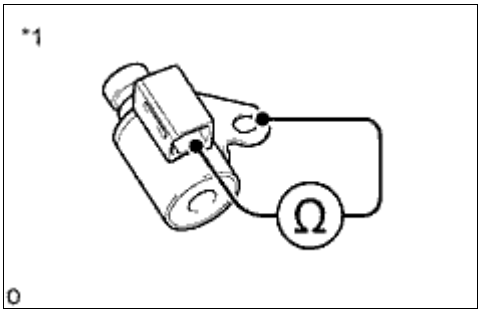
The torque converter operates normally.

NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

6.	**INSPECT SHIFT SOLENOID VALVE SL (RESISTANCE)**

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8F0LDX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P074513; Pressure Control Solenoid "A" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P074513**	**Pressure Control Solenoid "A" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P074513	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL1 circuit while driving and shifting gears (SL1 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL1 circuit • Shift solenoid valve SL1 • ECM	P0748

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL1 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL1 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0748: Shift solenoid valve SL1/Range check
Required sensors/Components	Shift solenoid valve SL1
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

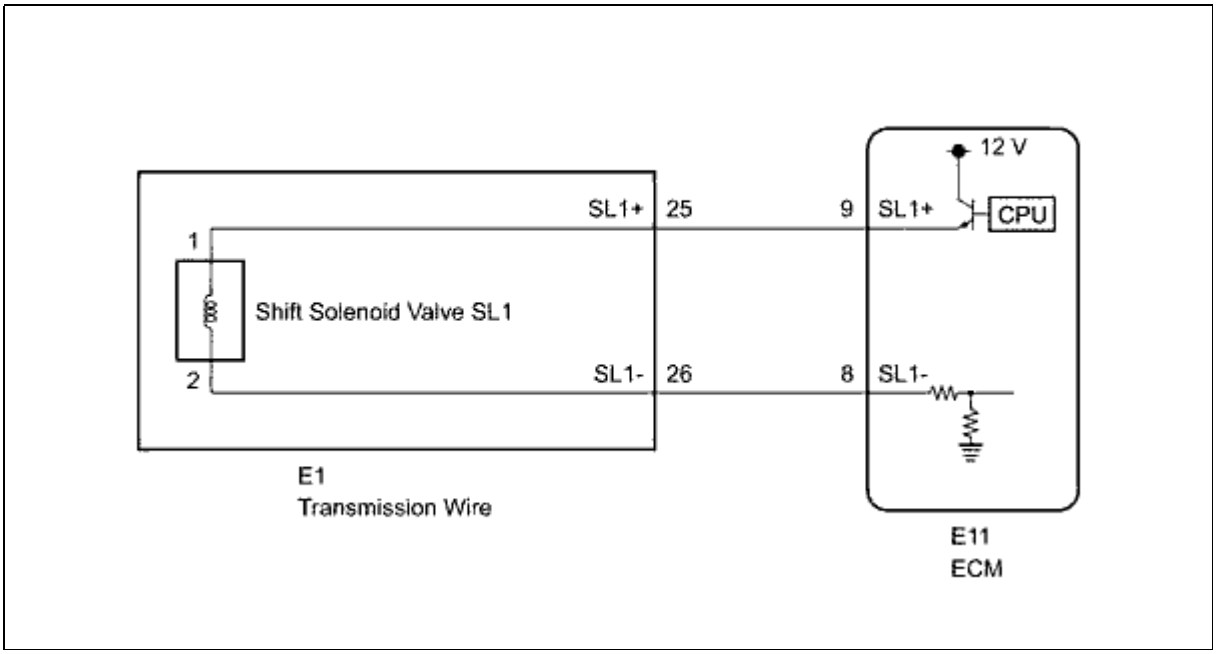
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL1 when the shift lever is in D:

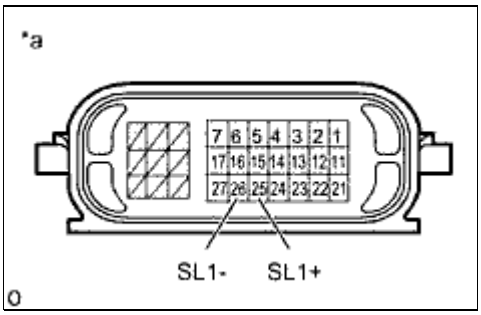
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL1)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
25 (SL1+) - 26 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
25 (SL1+) - Body ground	Always	10 kΩ or higher
26 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

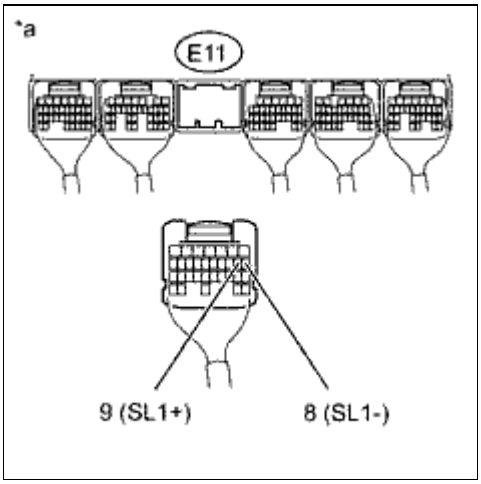
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E11-9 (SL1+) - E11-8 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
E11-9 (SL1+) - Body ground	Always	10 kΩ or higher
E11-8 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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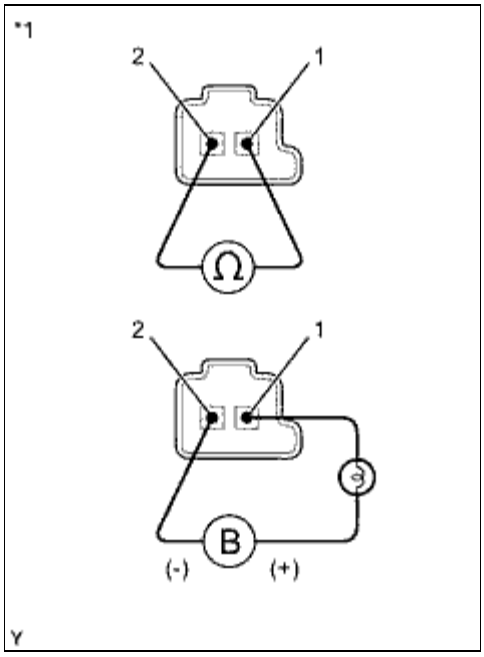
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL1

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL1

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VT08KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07457F; Pressure Control Solenoid "A" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07457F**	**Pressure Control Solenoid "A" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07457F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 1st, 2nd, 3rd or 4th gear is commanded. • Either condition is met twice: ○ When a shift to 5th gear is commanded, 4th gear is engaged. ○ When a shift to 6th gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL1 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)	P0746

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0746: Shift solenoid valve SL1 OFF malfunction Shift solenoid valve SL1 ON malfunction
Required sensors/Components	Shift solenoid valve SL1, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.

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MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

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HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction:

ECM selected gear	1st, 2nd, 3rd or 4th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction:

ECM selected gear	5th or 6th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

[ON malfunction]

2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

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1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07457F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07457F is output	A
P07457F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

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(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this

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lowered limit, the engine speed will increase freely.

- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P07957F)**

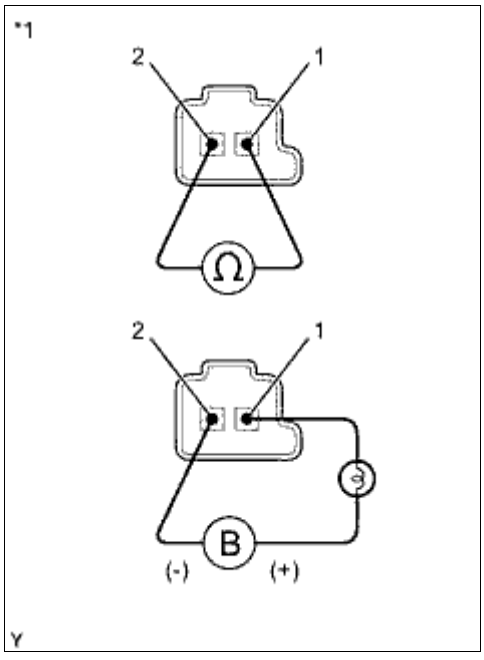
D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)**

E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P27137F)**

A ▼

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an

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operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL1

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL1**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8G0K4X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P077513; Pressure Control Solenoid "B" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P077513**	**Pressure Control Solenoid "B" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P077513	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL2 circuit while driving and shifting gears (SL2 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL2 circuit • Shift solenoid valve SL2 • ECM	P0778

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL2 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL2 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0778: Shift solenoid valve SL2/Range check
Required sensors/Components	Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

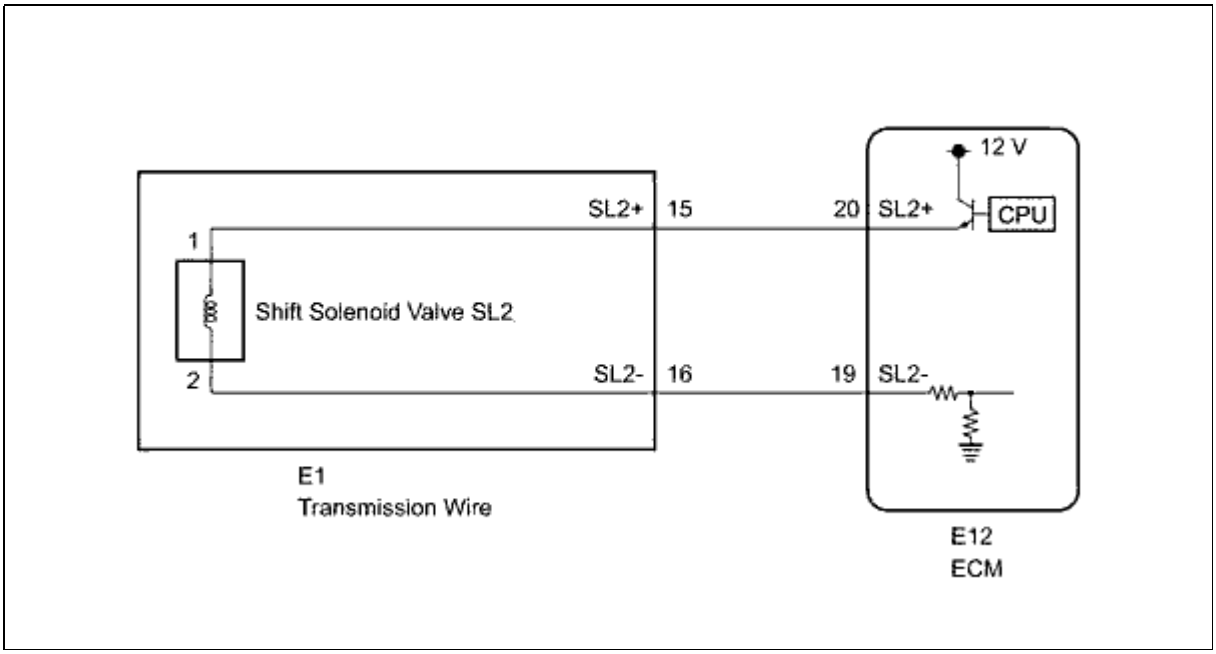
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL2 when the shift lever is in D:

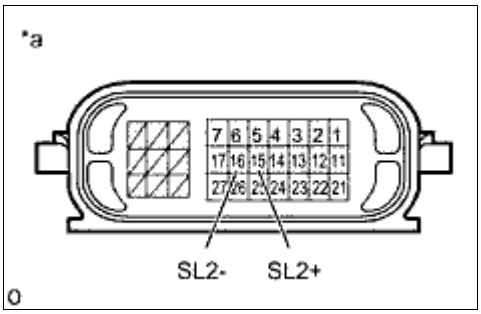
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test.
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL2)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
15 (SL2+) - 16 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
15 (SL2+) - Body ground	Always	10 kΩ or higher
16 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

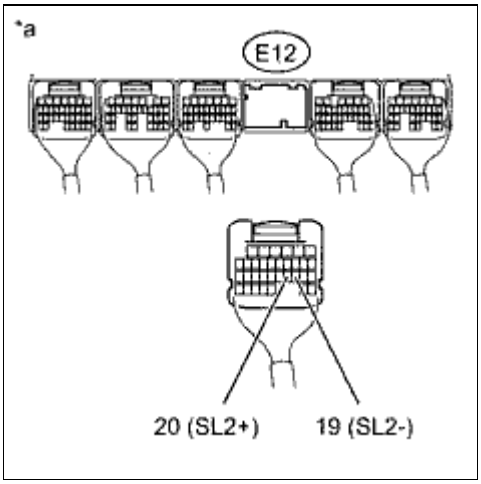
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-20 (SL2+) - E12-19 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
E12-20 (SL2+) - Body ground	Always	10 kΩ or higher
E12-19 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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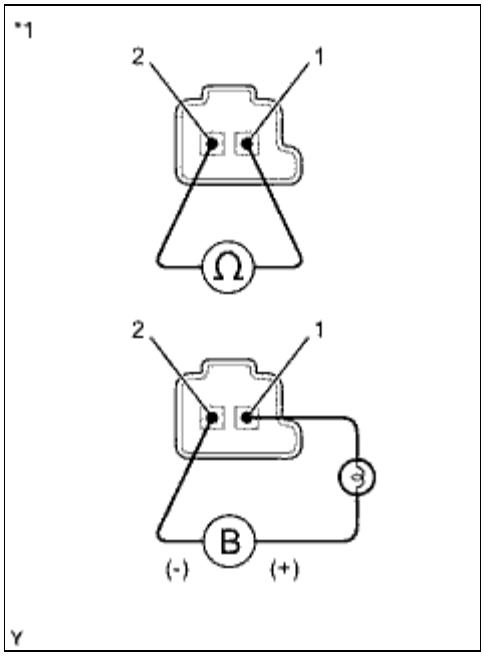
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL2

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VU08UX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07757F; Pressure Control Solenoid "B" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07757F**	**Pressure Control Solenoid "B" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07757F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 4th, 5th or 6th gear is commanded. • One of the following conditions is met twice: ○ When a shift to 1st gear is commanded, 4th gear is engaged. ○ When a shift to 2nd gear is commanded, 4th gear is engaged. ○ When a shift to 3rd gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL2 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)	P0776

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0776: Shift solenoid valve SL2/OFF malfunction Shift solenoid valve SL2/ON malfunction
Required sensors/Components	Shift solenoid valve SL2, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)

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Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more

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TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction:

ECM selected gear	4th, 5th or 6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction (A):

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (B):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (C):

ECM selected gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

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OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

[ON malfunction]

One of the following conditions is met: ON malfunction (A), (B) or (C)
2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction (A), (B) or (C):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07757F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07757F is output	A
P07757F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

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A GO TO STEP 3

B

2.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

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(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO STEP 3**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P07957F)**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)**

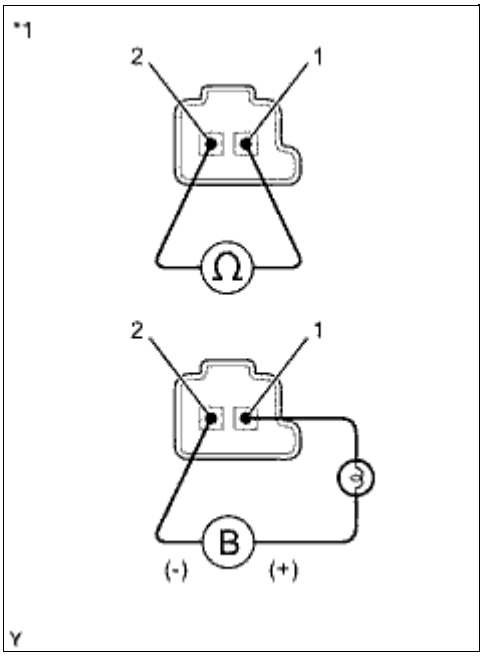
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P27137F)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P07457F)**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

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(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL2**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015W808KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P079513; Pressure Control Solenoid "C" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P079513**	**Pressure Control Solenoid "C" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P079513	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL3 circuit while driving and shifting gears (SL3 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL3 circuit • Shift solenoid valve SL3 • ECM	P0798

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL3 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL3 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0798: Shift solenoid valve SL3/Range check
Required sensors/Components	Shift solenoid valve SL3
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

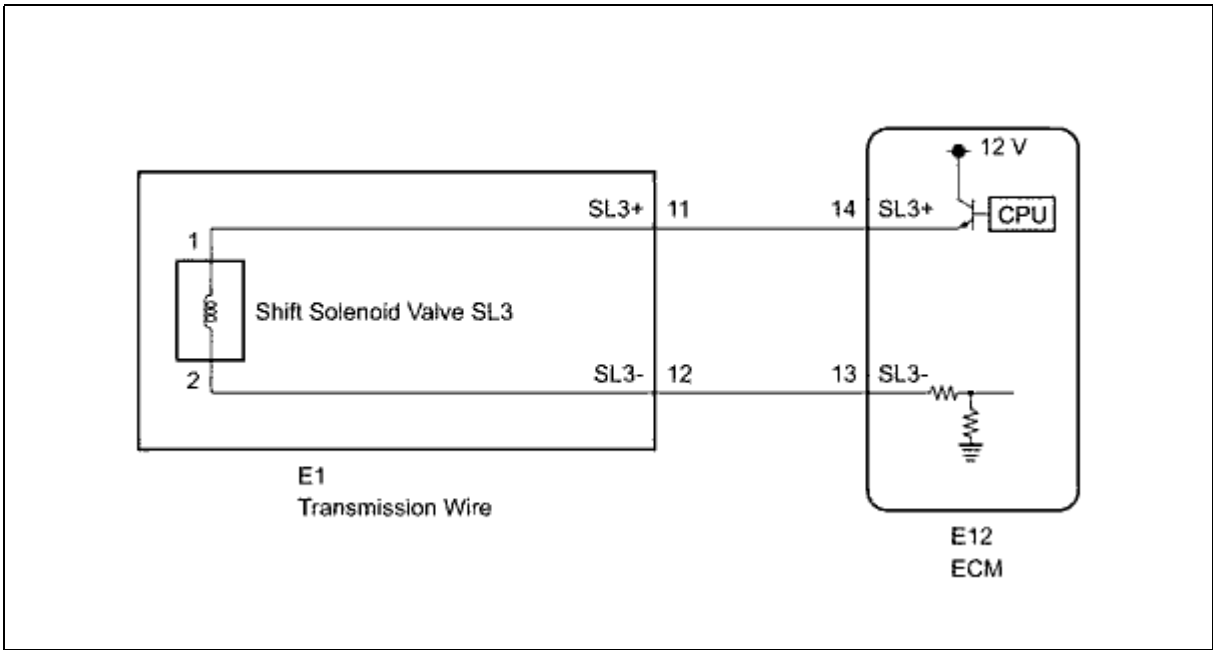
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL3 when the shift lever is in D:

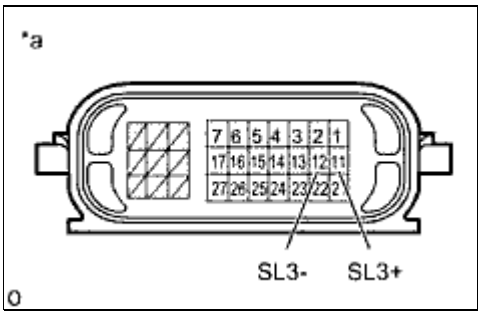
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL3)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
11 (SL3+) - 12 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
11 (SL3+) - Body ground	Always	10 kΩ or higher
12 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

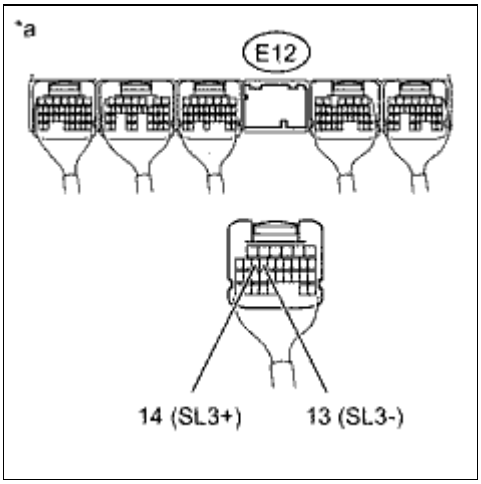
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-14 (SL3+) - E12-13 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
E12-14 (SL3+) - Body ground	Always	10 kΩ or higher
E12-13 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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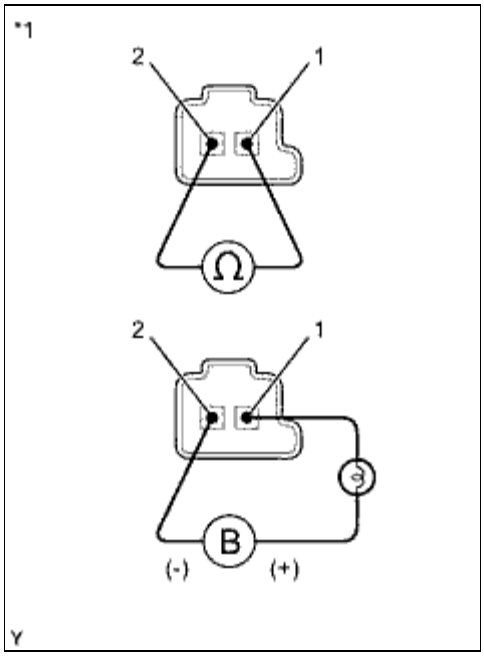
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL3**

(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL3

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VV08SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P07957F; Pressure Control Solenoid "C" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P07957F**	**Pressure Control Solenoid "C" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P07957F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 2nd or 6th gear is commanded. • The following condition is met twice: When a shift to 1st gear is commanded, 2nd gear is engaged.	• Shift solenoid valve SL3 remains open or closed. • Transmission valve body assembly is blocked. • Automatic transmission assembly (clutch, brake or gear etc.)	P0796

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0796: Shift solenoid valve SL3/OFF malfunction Shift solenoid valve SL3/ON malfunction
Required sensors/Components	Shift solenoid valve SL3, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C) and (D): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

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TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

HINT:

*: Following conditions are met

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Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction (A):

ECM selected gear	2nd
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (B):

ECM selected gear	6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (C):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle: (When condition "D" is not detected)	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
Throttle valve opening angle: (When condition "D" is detected)	0% or more at output speed 900 rpm (Condition varies with output speed)
ECT (engine coolant temperature)	40°C (104°F) or higher

OFF malfunction (D):

Throttle valve opening angle	0% or more at output speed 900 rpm (Condition varies with output speed)

ON malfunction:

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (engine coolant temperature)	40°C (104°F) or higher

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TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or ((C) and (D))

OFF malfunction (A):

Turbine speed - Output speed x 2nd gear ratio	1000 rpm or more

OFF malfunction (B):

Turbine speed - Output speed x 6th gear ratio	1000 rpm or more

OFF malfunction (C) and (D):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.3

[ON malfunction]

2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	1.95 to 2.4

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P07957F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

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(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P07957F is output	A
P07957F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
			damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO STEP 3**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)**

E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID**

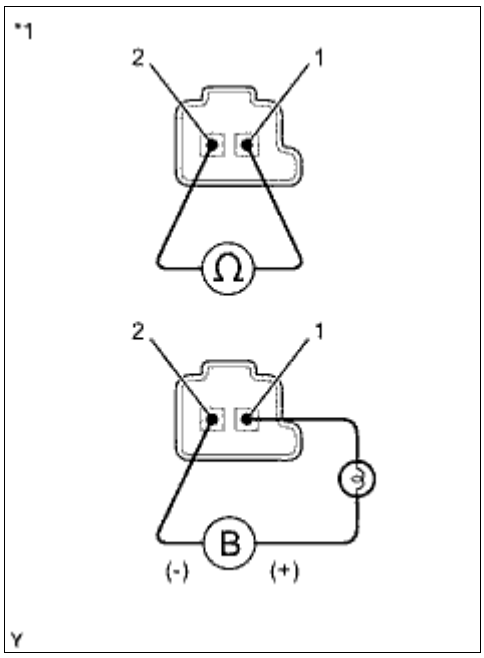
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VALVE SLT PERFORMANCE DTC P27137F)

A ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P07457F)

3.	**INSPECT SHIFT SOLENOID VALVE SL3**

(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

NG ▶ REPLACE SHIFT SOLENOID VALVE SL3

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OK

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK → **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8A0OLX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P271313; Pressure Control Solenoid "D" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P271313**	**Pressure Control Solenoid "D" Circuit Open**

DESCRIPTION

Refer to the system description for DTC P27137F INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P271313	Open or short is detected in shift solenoid valve SLT circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM	P2716

MONITOR DESCRIPTION

When an open or short in the shift solenoid valve SLT circuit is detected, the ECM interprets this as a fault. The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2716: Shift solenoid valve SLT/Range check
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

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Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

Condition (D):

Battery voltage	11 V or higher
Target current	0.2 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B), (C) or (D)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

Output duty cycle	Less than 0%

Condition (D):

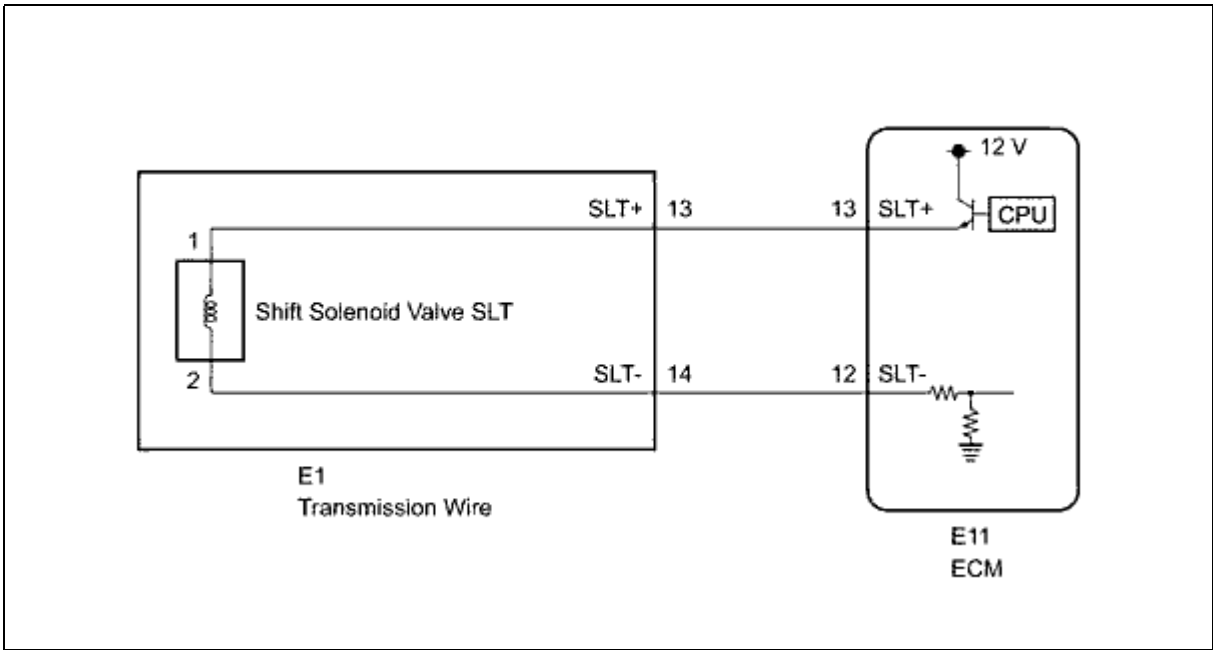
Solenoid voltage monitor	No signal

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%
Solenoid voltage monitor	Signal input

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

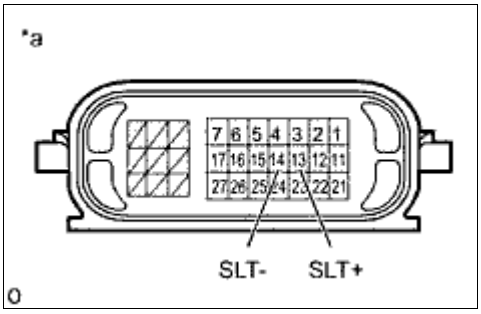
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLT)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
13 (SLT+) - 14 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
13 (SLT+) - Body ground	Always	10 kΩ or higher
14 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

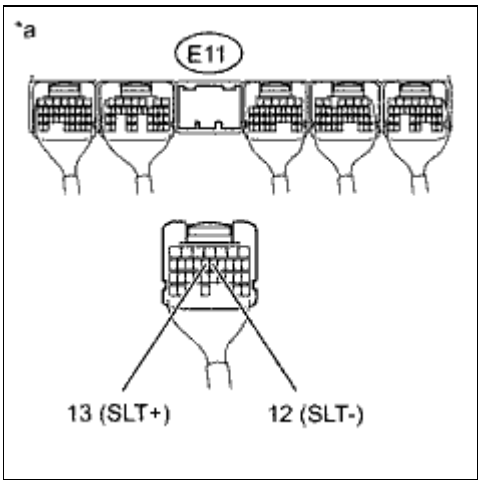
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK
▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E11-13 (SLT+) - E11-12 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
E11-13 (SLT+) - Body ground	Always	10 kΩ or higher
E11-12 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

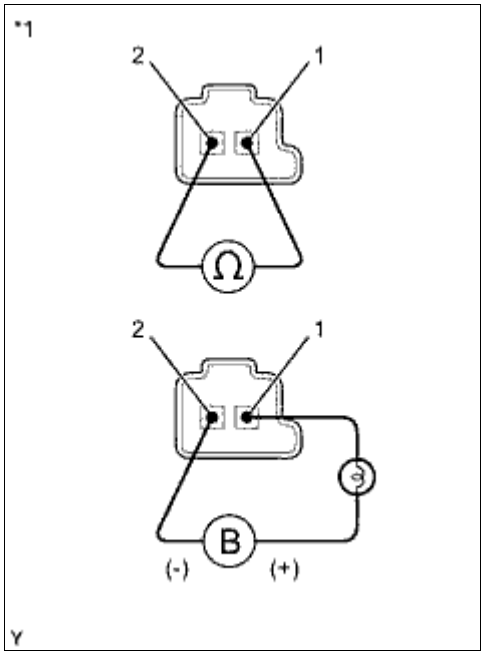
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NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE ECM

3.	**INSPECT SHIFT SOLENOID VALVE SLT**

(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLT

NG ▶ REPLACE SHIFT SOLENOID VALVE SLT

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OK ▶ REPLACE TRANSMISSION WIRE

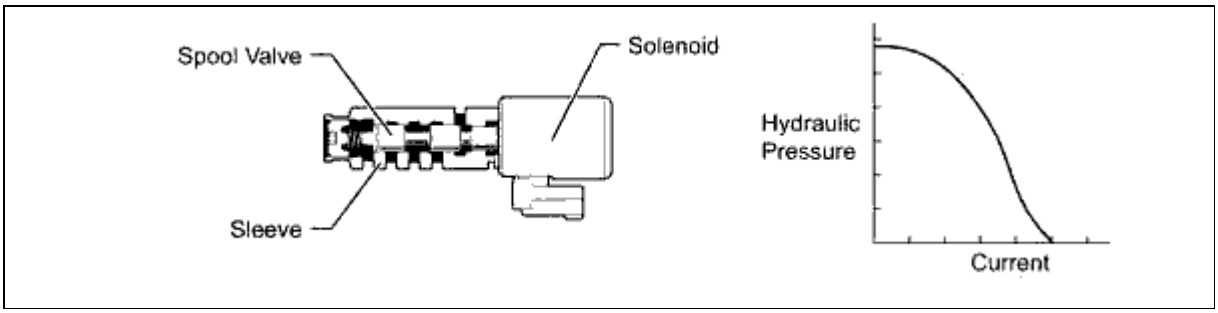
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W830PVX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P27137F; Pressure Control Solenoid "D" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P27137F**	**Pressure Control Solenoid "D" Actuator Stuck Off**

SYSTEM DESCRIPTION

The shift solenoid valve SLT controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the current to shift solenoid valve SLT to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P27137F	The ECM detects a malfunction in the shift solenoid valve SLT (ON side) according to the difference in the speed between the turbine and the output shaft, and also by the ATF pressure. (2 trip detection logic)	• Shift solenoid valve SLT remains open • Shift solenoid valve SL1, SL2, SL3 or SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear, etc.)	P2714

MONITOR DESCRIPTION

The ECM calculates the amount of clutch slip based on the input turbine speed, output shaft speed, and gear ratio. If the amount of clutch slip exceeds a specified level, the ECM will set this DTC and illuminate the MIL.

When shift solenoid valve SLT remains on, the line pressure goes down and clutch engagement force decreases.

NOTICE:

If the vehicle continues to be driven under these conditions, the clutch will burn up and the vehicle will no longer be drivable.

MONITOR STRATEGY

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Related DTCs	P2714: Shift solenoid valve SLT/ON malfunction
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	ON malfunction: 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ON malfunction:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2716 (Shift solenoid valve SLT circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLT circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: ON malfunction (A), (B), (C), (D), (E), (F) or (G)

ON malfunction (A):

Summation of clutch heat generations	Specified value

ON malfunction (B):

Shift solenoid valve SL1 ON malfunction	Detected

ON malfunction (C):

Shift solenoid valve SL1 OFF malfunction	Detected

ON malfunction (D):

Shift solenoid valve SL2 OFF malfunction	Detected

ON malfunction (E):

Shift solenoid valve SL3 OFF malfunction	Detected

ON malfunction (F):

Shift solenoid valve SL4 ON malfunction	Detected

ON malfunction (G):

Shift solenoid valve SL4 OFF malfunction	Detected

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P27137F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P27137F is output	A
P27137F and other DTCs are output	B

HINT:

If a solenoid is stuck on, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 4**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE SOLENOID (SLT))**

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.

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- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.

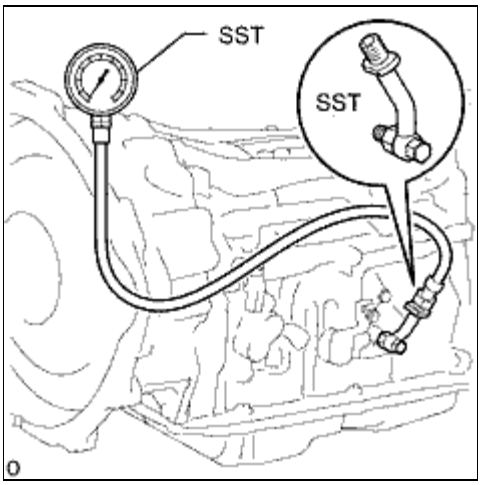
HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Turn the ignition switch off.

(b) Lift the vehicle up.

(c) Remove the test plug from the transmission case and connect SST.



SST: 09993-19015

09993-00010

09993-00040

(d) Lower the vehicle.

(e) Fully apply the parking brake and chock the 4 wheels.

(f) Connect the Techstream to the DLC3.

(g) Start the engine.

(h) Warm up the ATF (Automatic Transmission Fluid).

(i) Measure the line pressure when the engine is idling.

(j) Turn the Techstream on.

(k) Enter the following menus: Powertrain / Transmission / Active Test.

(l) Follow the instructions on the Techstream and perform the Active Test.

(m) Measure the line pressure with SST.

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the	Operates shift	ON/OFF	[Vehicle Condition]

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Solenoid (SLT)*	solenoid valve SLT to raise the line pressure.	**HINT:** ON: No action (normal operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid (SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	• Vehicle Stopped • Engine idling

*: The "Activate the solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

Note that the pressure readings for the Active Test and Hydraulic Test are different.

OK:

The line pressure changes as specified when performing the Active Test.

NG ▶ **GO TO STEP 4**

OK ▼

3.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID**

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VALVE SL3 PERFORMANCE DTC P07957F)

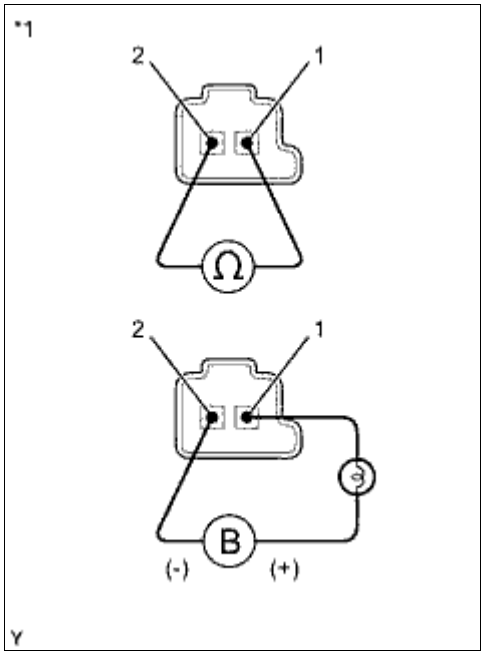
D ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P28077F)

E ▶ GO TO STEP 4

A ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)

4.	INSPECT SHIFT SOLENOID VALVE SLT

(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

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*1	Shift Solenoid Valve SLT

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLT**

OK
▼

5.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000012XR0AKX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P274011; Transmission Fluid Temperature Sensor "B" Circuit Short to Ground; 2016 MY Tacoma [08/2015 -]		

DTC	**P274011**	**Transmission Fluid Temperature Sensor "B" Circuit Short to Ground**

DESCRIPTION

The No. 2 ATF temperature sensor is installed in the transmission valve body assembly.

If the ECM detects an abnormally high ATF temperature near this sensor, it illuminates the warning indicator.

HINT:

- The temperature of ATF easily rises when towing, climbing hills, in traffic, etc.
- If the No. 2 ATF temperature sensor becomes short-circuited, the signal that indicates that the ATF temperature is 150°C (302°F) or higher is input into the ECM.

Vehicle conditions when the sensor is normal and when the sensor is short-circuited are indicated in the table below.

NO. 2 ATF TEMPERATURE SENSOR STATE	DETECTION CONDITION	SYMPTOM	RECOVERY CONDITION
Sensor is normal	ATF temperature higher than 150°C (302°F)	ATF temperature warning indicator remains on	ATF temperature below 135°C (275°F)*1
	ATF temperature higher than 130°C (266°F)	Shift point too high	ATF temperature below 110°C (230°F)
Sensor is short-circuited	Any conditions	Shift point too high	Symptoms still occur
	Engine coolant temperature higher than 95°C (203°F)	Lock-up at 3rd gear*2	Symptoms still occur

HINT:

*1: When ATF temperature is in the normal range, it decreases to below 135°C (275°F) within 5 minutes with the shift lever in P or N in an idling state.

*2: When ATF temperature is normal, transmission lock-up occurs in 4th, 5th and 6th gear with the shift lever in D or with the S6 range selected, in 4th or 5th gear with the S5 range selected, and 4th gear with the S4 range selected.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P274011	The output voltage from the No. 2 ATF temperature sensor is below 0.0459 V for 0.5 seconds or more (1 trip detection logic).	• Short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor (transmission wire) • ECM	P2742

MONITOR DESCRIPTION

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The No. 2 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects a short in the No. 2 ATF temperature sensor circuit. If the resistance value of the No. 2 ATF temperature sensor is below 25 Ω*, the ECM interprets this as a fault in the No. 2 ATF temperature sensor or wiring. The ECM stores the DTC.

*: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

WIRING DIAGRAM

Refer to DTC P071011 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 3 seconds or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 2	No. 2 ATF temperature sensor value/	• Approx. 80°C (176°F): After stall	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: -40°C (-40°F) Max.: 150°C (302°F)	test • Equal to ambient temperature when cold soak	

HINT:

- When DTC P274011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.
- When DTC P274015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

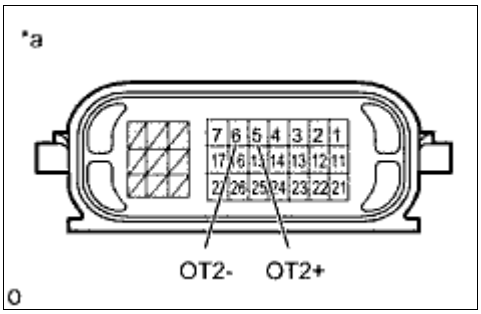
Check the temperature displayed on the Techstream in order to check if a malfunction exists.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

PROCEDURE

1.	**INSPECT NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
5 (OT2+) - Body ground	Always	10 kΩ or higher
6 (OT2-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ

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25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

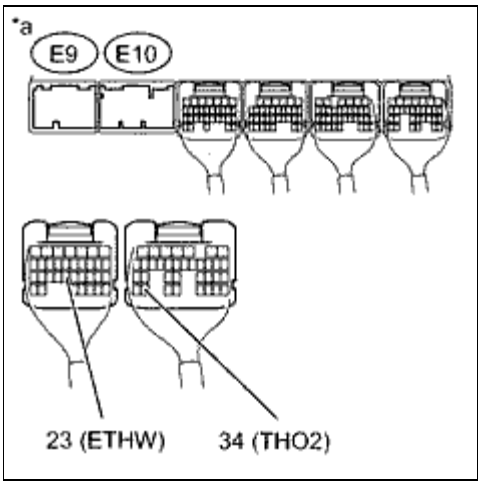
*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connectors.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-34 (THO2) - E9-23 (ETHW)	Always	25 Ω to 156 kΩ
E10-34 (THO2) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

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OK ▶ REPLACE ECM

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000012XR0ANX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P274015; Transmission Fluid Temperature Sensor "B" Circuit Short to Battery or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P274015**	**Transmission Fluid Temperature Sensor "B" Circuit Short to Battery or Open**

DESCRIPTION

The No. 2 ATF temperature sensor is installed in the transmission valve body assembly.

If the ECM detects an abnormally high ATF temperature near this sensor, it illuminates the warning indicator.

HINT:

The temperature of ATF easily rises when towing, climbing hills, in traffic, etc.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P274015	The output voltage from the No. 2 ATF temperature sensor is higher than 4.915 V for 0.5 seconds or more and either condition is met (1 trip detection logic): (A) 15 minutes or more have elapsed after the engine start when the engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 seconds or more have elapsed after the engine start when the engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open or short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor (transmission wire) • ECM	P2743

MONITOR DESCRIPTION

The No. 2 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 2 ATF temperature sensor circuit. If the resistance value of the No. 2 ATF temperature sensor is higher than 156 kΩ*, the ECM interprets this as a fault in the No. 2 ATF temperature sensor or wiring. The ECM stores the DTC.

*: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

WIRING DIAGRAM

Refer to DTC P071011 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

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HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 15 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature No. 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.

HINT:

- When DTC P274011 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.
- When DTC P274015 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

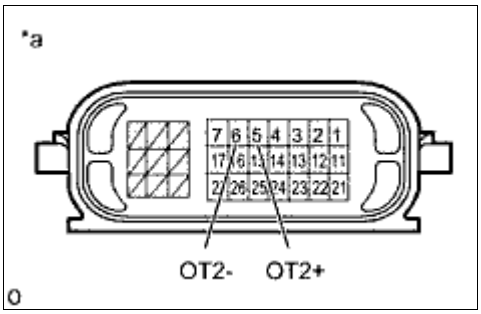
TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

PROCEDURE

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1.	**INSPECT NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
5 (OT2+) - Body ground	Always	10 kΩ or higher
6 (OT2-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

*a	Component without harness connected (Transmission Wire)

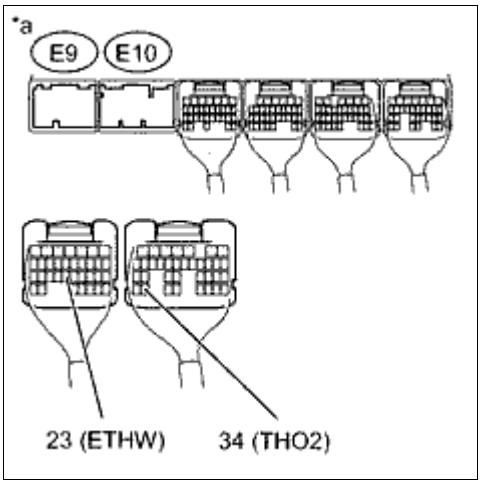
NG ▶ **REPLACE NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E10-34 (THO2) - E9-23 (ETHW)	Always	25 Ω to 156 kΩ

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W890M3X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P275613; Torque Converter Clutch Pressure Control Solenoid Control Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P275613**	**Torque Converter Clutch Pressure Control Solenoid Control Circuit Open**

DESCRIPTION

Refer to the system description for DTC P27567F INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P275613	Open or short is detected in shift solenoid valve SLU circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLU circuit • Shift solenoid valve SLU • ECM	P2759

MONITOR DESCRIPTION

When an open or short in a shift solenoid valve SLU circuit is detected, the ECM determines there is a malfunction. The ECM will illuminate the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P2759: Shift solenoid valve SLU/Range check
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

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Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

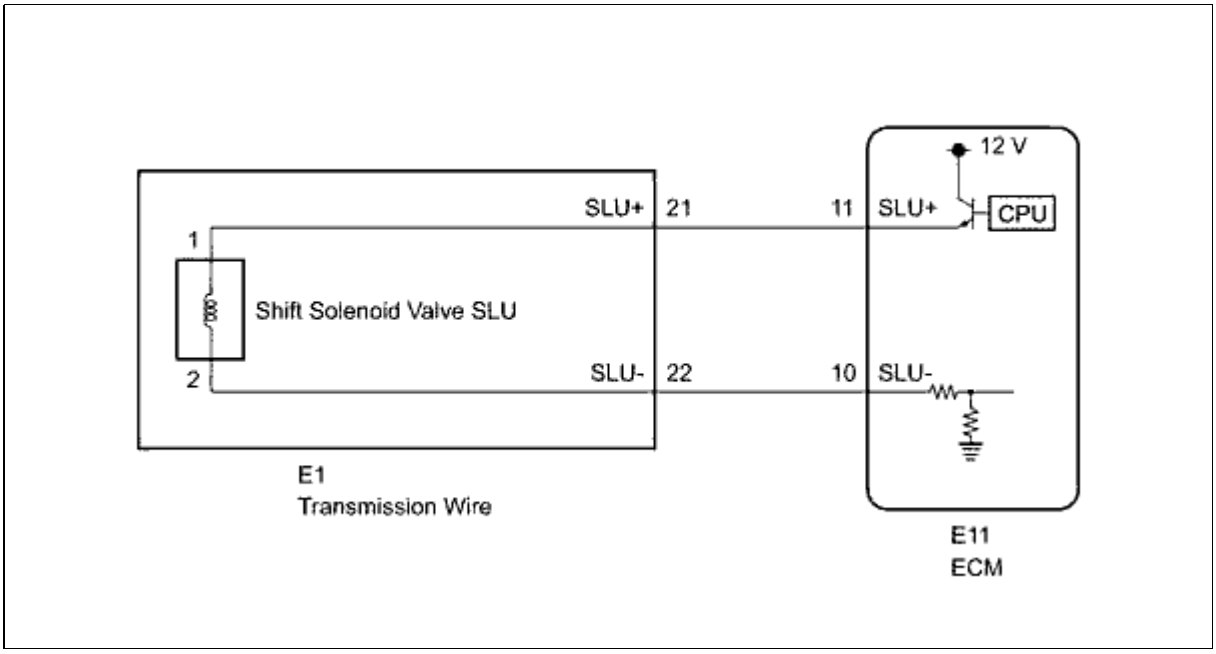
Condition (C):

Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

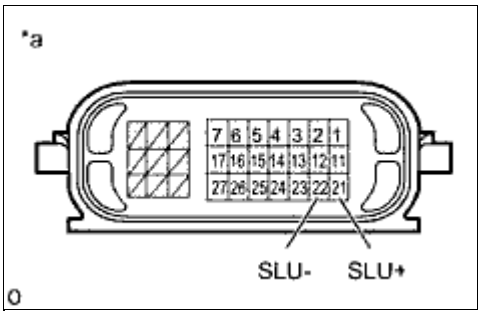
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLU)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
21 (SLU+) - 22 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
21 (SLU+) - Body ground	Always	10 kΩ or higher
22 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Transmission Wire)

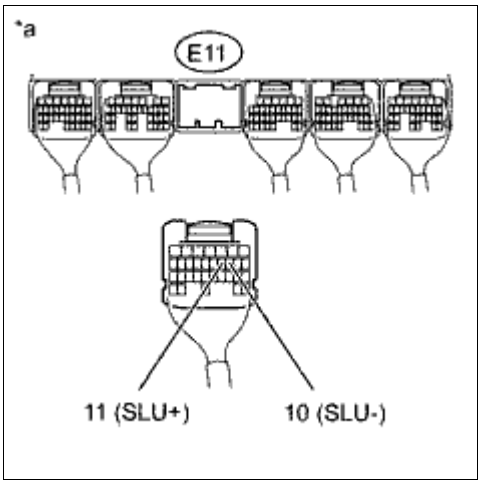
NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

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(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E11-11 (SLU+) - E11-10 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
E11-11 (SLU+) - Body ground	Always	10 kΩ or higher
E11-10 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

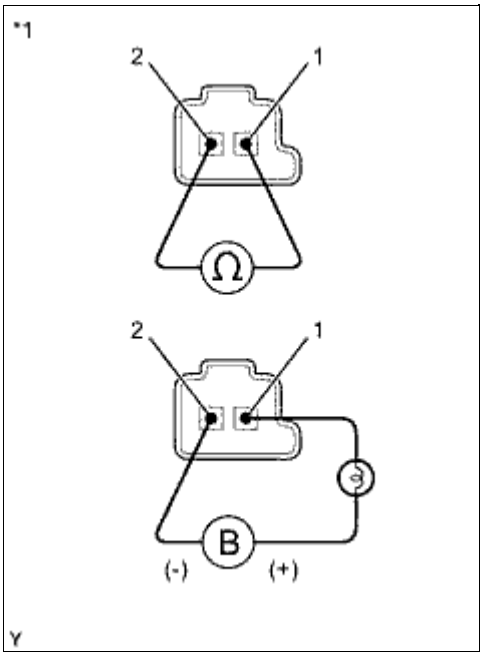
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SLU**

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(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▶ **REPLACE TRANSMISSION WIRE**

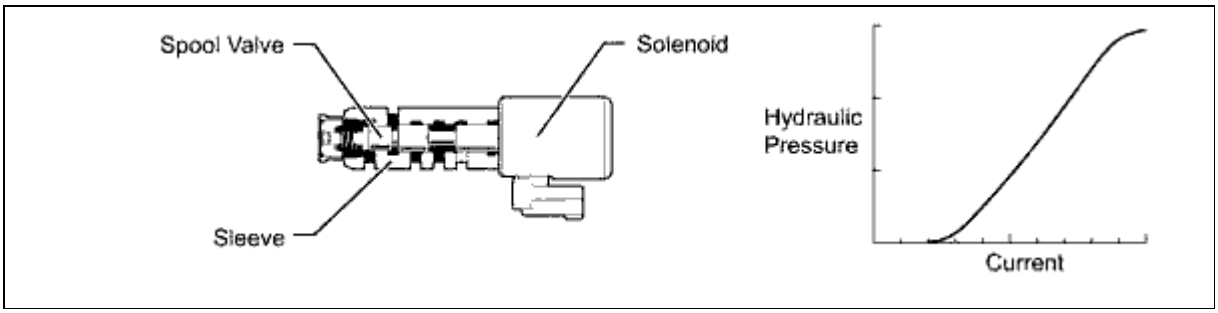
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8D0KFX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P27567F; Torque Converter Clutch Pressure Control Solenoid Control Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P27567F**	**Torque Converter Clutch Pressure Control Solenoid Control Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, mass air flow meter, input turbine speed sensor, output shaft speed sensor and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.



The ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SLU, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P27567F	Both conditions are met (2 trip detection logic): • Lock-up does not occur when requested. • Lock-up occurs when shift solenoid valve SLU is requested to turn on in the lock-up range.	• Shift solenoid valve SLU remains open or closed • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear, etc.) • Line pressure is too low	P2757

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SLU. When shift solenoid valve SLU is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

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If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SLU or lock-up system performance.

The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)
- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P2757: Shift solenoid valve SLU OFF malfunction Shift solenoid valve SLU ON malfunction
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec. ON malfunction: 1.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system))

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	U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376

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Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

ON malfunction:

ECM lock-up command	OFF (SLU pressure: Below 4 kPa (0.04 kgf/cm ^{2} , 0.6 psi))
Duration time from SLU command	3 sec. or more
Duration time from SL command ON	0.064 sec. or more
Shift solenoid valve SLU (P2757)	Not OFF malfunction
Throttle valve opening angle	11.5% or more at turbine speed of 4000 rpm (Condition varies with turbine speed)
Vehicle speed	Less than 120 km/h (74.5 mph)

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

| Engine speed - Turbine speed |	70 rpm or more

ON malfunction:

| Engine speed - Turbine speed |	Less than 35 rpm

COMPONENT OPERATING RANGE

Speed sensor (NT)	Input speed is equal to engine speed when lock-up is ON.

INSPECTION PROCEDURE

NOTICE:

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- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up Solenoid	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more

HINT:

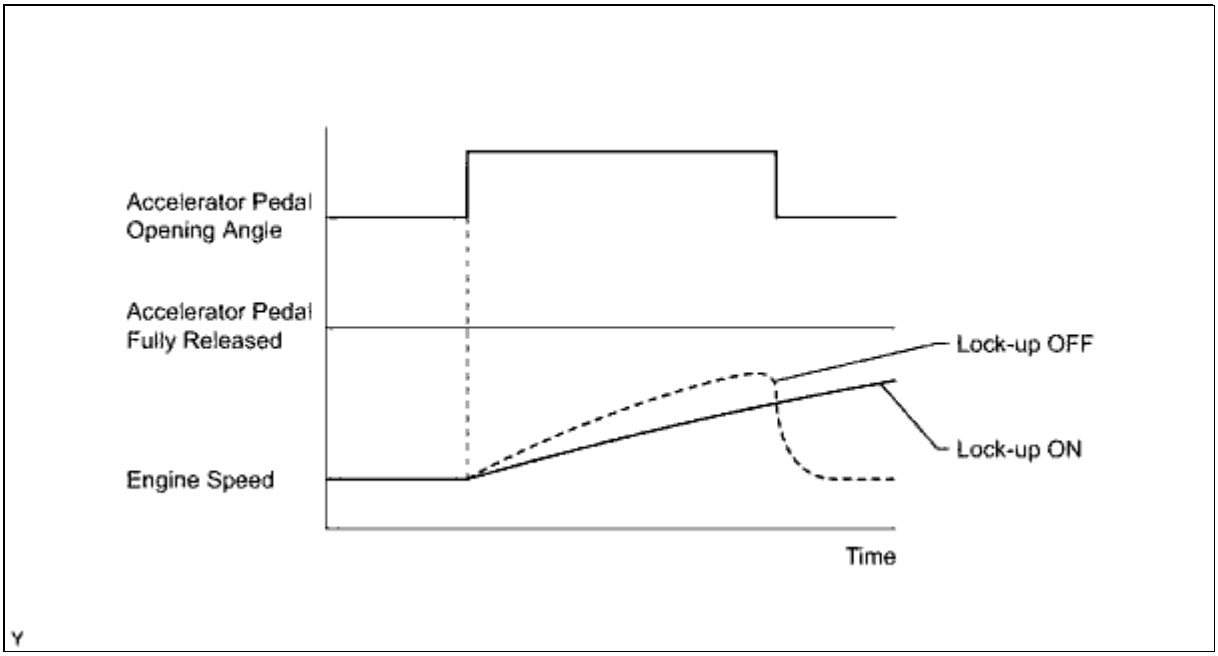
This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)

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PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P27567F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P27567F is output	A
P27567F and other DTCs are output	B

HINT:

If any DTCs other than P27567F are output, perform troubleshooting for those DTCs first.

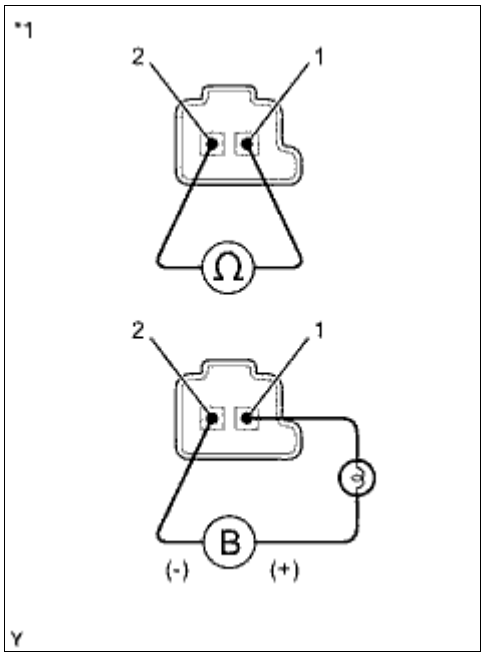
B ▶ **GO TO DTC CHART**

A ▼

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2.	**INSPECT SHIFT SOLENOID VALVE SLU**

(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▼

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3.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

4.	**INSPECT TORQUE CONVERTER ASSEMBLY**

(a) Check the torque converter assembly INFO .

OK:

The torque converter assembly operates normally.

NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000002IR0059X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P277111; Four Wheel Drive (4WD) Low Switch Circuit Short to Ground; 2016 MY Tacoma [08/2015 -]		

DTC	**P277111**	**Four Wheel Drive (4WD) Low Switch Circuit Short to Ground**

DESCRIPTION

The ECM detects the signal from the L4 detection switch.

This DTC indicates that the L4 detection switch remains on.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P277111	Transfer L4 detection switch remains on while the vehicle is being driven under the following conditions for 1.8 seconds or more (1 trip detection logic): (a) Output shaft speed is between 1000 and 3000 rpm. (b) Transfer position switch is in 2WD or 4H.	• Short in L4 detection switch circuit • Transfer system • ECM	P2773

MONITOR DESCRIPTION

The ECM monitors the L4 detection switch to determine when the transfer case L4 gears are engaged. If the transfer case L4 gears remain engaged under the following conditions, the ECM will conclude that there is a malfunction of the L4 detection switch, illuminate the MIL and store the DTC:

- The L4 detection switch indicates that the L4 transfer case gears are engaged.
- The transfer position switch is in 2WD or 4H.
- The transfer case output shaft speed is between 1000 and 3000 rpm.
- The specified time period has elapsed.

MONITOR STRATEGY

Related DTCs	P2773: Transfer L4 detection switch/ON malfunction
Required sensors/Components	Transfer L4 detection switch
Frequency of operation	Continuous
Duration	1.8 seconds
MIL operation	1 driving cycle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ON Malfunction:

The monitor will run whenever the following DTCs are not stored	None

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Vehicle speed sensor circuit fail (P0500)	Not detected
Output speed sensor circuit fail (P0722, P077C, P077D)	Not detected
L4 switch	ON
Output speed (Transfer output speed)	1000 to 3000 rpm

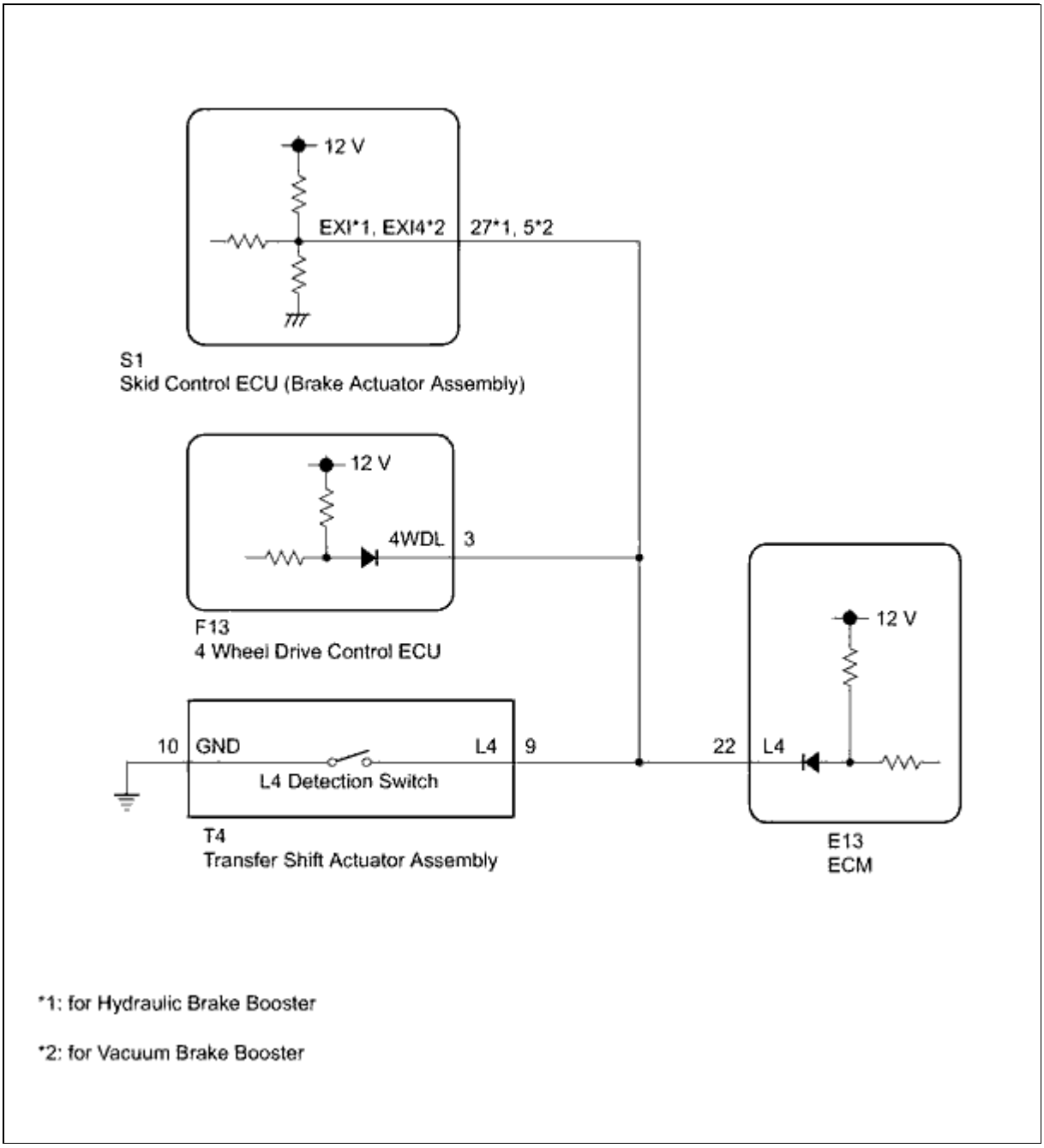
TYPICAL MALFUNCTION THRESHOLDS

ON Malfunction:

Actual transfer gear ratio Transfer input speed / Transfer output speed	0.9 to 1.1

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

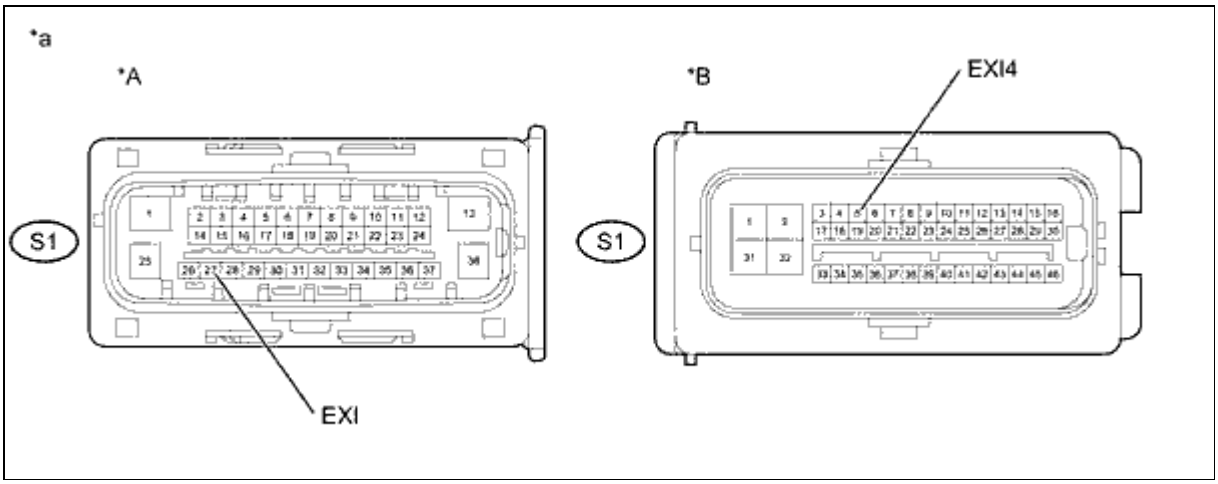
1. Turn the transfer position switch to 2WD.
2. Perform the D Position Shift Test in Road Test INFO .
3. Check for DTCs again INFO .

PROCEDURE

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1.	**CHECK SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)**

(a) Disconnect the skid control ECU (brake actuator assembly) connector.



Text in Illustration

*A	for Hydraulic Brake Booster	*B	for Vacuum Brake Booster
*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))	-	-

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

for Hydraulic brake booster

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
S1-27 (EXI) - Body ground	Transfer position switch not 4L	10 kΩ or higher

for Vacuum brake booster

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
S1-5 (EXI4) - Body ground	Transfer position switch not 4L	10 kΩ or higher

Result

RESULT	PROCEED TO
NG	A
OK (for Hydraulic brake booster)	B
OK (for Vacuum brake booster)	C

B ▶ **GO TO BRAKE CONTROL SYSTEM**

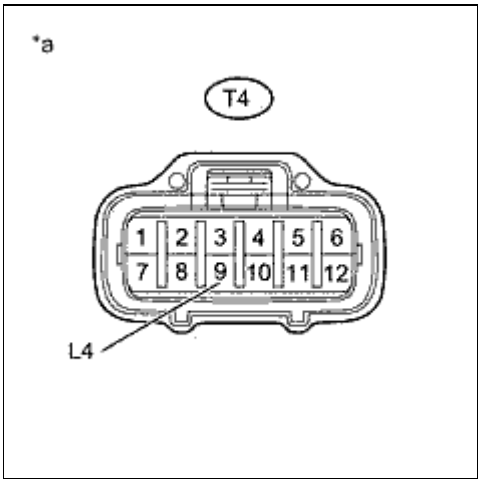
C ▶ **GO TO BRAKE CONTROL SYSTEM**

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A

2.	CHECK TRANSFER SHIFT ACTUATOR ASSEMBLY

(a) Disconnect the transfer shift actuator assembly connector.



(b) Disconnect the S1 skid control ECU (brake actuator assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T4-9 (L4) - Body ground	Transfer position switch not 4L	10 kΩ or higher

Text in Illustration

*a	Front view of wire harness connector (to Transfer Shift Actuator Assembly)

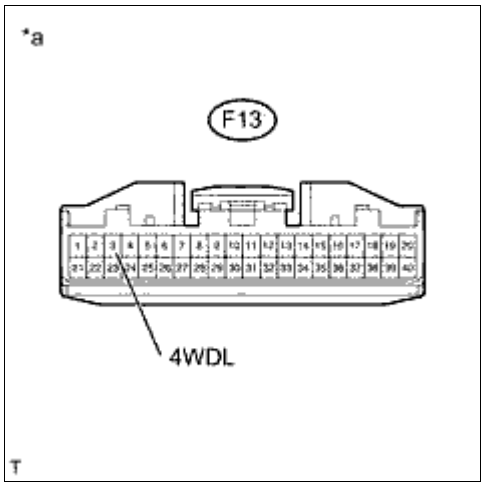
NG ▶ **GO TO STEP 3**

OK ▶ **GO TO TOUCH SELECT 2-4 AND HIGH-LOW SYSTEM**

3.	CHECK 4 WHEEL DRIVE CONTROL ECU

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(a) Disconnect the 4 wheel drive control ECU connector.



(b) Disconnect the T4 transfer shift actuator assembly connector.

(c) Disconnect the S1 skid control ECU (brake actuator assembly) connector.

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
F13-3 (4WDL) - Body ground	Transfer position switch not 4L	10 kΩ or higher

Text in Illustration

*a	Front view of wire harness connector (to 4 Wheel Drive Control ECU)

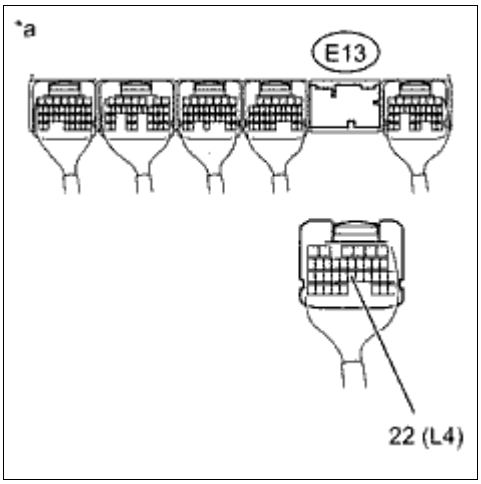
NG ▶ **GO TO STEP 4**

OK ▶ **GO TO TOUCH SELECT 2-4 AND HIGH-LOW SYSTEM**

4.	**CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU, TRANSFER SHIFT ACTUATOR ASSEMBLY, 4 WHEEL DRIVE CONTROL ECU - ECM)**

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(a) Disconnect the ECM connector.



(b) Disconnect the F13 4 wheel drive control ECU connector.

(c) Disconnect the T4 transfer shift actuator assembly connector.

(d) Disconnect the S1 skid control ECU (brake actuator assembly) connector.

(e) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
E13-22 (L4) - Body ground	Transfer position switch not 4L	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000002IR005AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P277115; Four Wheel Drive (4WD) Low Switch Circuit Short to Battery or Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P277115**	**Four Wheel Drive (4WD) Low Switch Circuit Short to Battery or Open**

DESCRIPTION

Refer to the system description for DTC P277111 INFO .

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P277115	Transfer L4 detection switch remains off while the vehicle is being driven under the following conditions for 1.8 seconds or more (1 trip detection logic): (a) Output shaft speed is between 1000 and 3000 rpm. (b) Transfer position switch is in 4L.	• Open in transfer L4 detection switch circuit • Transfer system • ECM	P2774

MONITOR DESCRIPTION

The ECM monitors the L4 detection switch to determine when the transfer case L4 gears are engaged. If the transfer case 4H gears remain engaged under the following conditions, the ECM will conclude that there is a malfunction of the L4 detection switch, illuminate the MIL and store the DTC:

- The L4 detection switch indicates that the 4H transfer case gears are engaged.
- The transfer position switch is in 4L.
- The transfer case output shaft speed is between 1000 and 3000 rpm.
- The specified time period has elapsed.

MONITOR STRATEGY

Related DTCs	P2774: Transfer L4 detection switch/OFF malfunction
Required sensors/Components	Transfer L4 detection switch
Frequency of operation	Continuous
Duration	1.8 seconds
MIL operation	1 driving cycle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

OFF Malfunction:

The monitor will run whenever the following DTCs are not stored	None
Vehicle speed sensor circuit fail (P0500)	Not detected

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Output speed sensor circuit fail (P0722, P077C, P077D)	Not detected
L4 switch	OFF
Output speed (Transfer output speed)	1000 to 3000 rpm

TYPICAL MALFUNCTION THRESHOLDS

OFF Malfunction:

Actual transfer gear ratio Transfer input speed / Transfer output speed	2.3 to 2.83

WIRING DIAGRAM

Refer to DTC P277111 INFO

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the transfer position switch to 4L.
2. Drive the vehicle at 15 to 20 km/h (9 to 12 mph) for 1.8 seconds or more.
3. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK HARNESS AND CONNECTOR (ECM - TRANSFER SHIFT ACTUATOR ASSEMBLY)**

(a) Disconnect the E13 ECM connector.

(b) Disconnect the T4 transfer shift actuator assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E13-22 (L4) - T4-9 (L4)	Always	Below 1 Ω

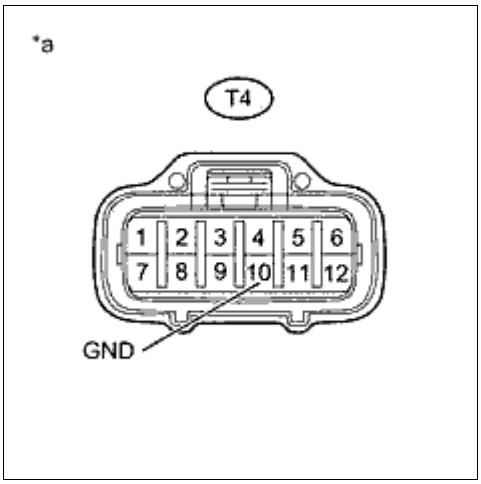
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

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2.	**CHECK HARNESS AND CONNECTOR (TRANSFER SHIFT ACTUATOR ASSEMBLY - BODY GROUND)**

(a) Disconnect the transfer shift actuator assembly connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T4-10 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Transfer Shift Actuator Assembly)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

3.	**INSPECT TRANSFER SHIFT ACTUATOR ASSEMBLY**

(a) Inspect the transfer shift actuator assembly.

INFO .

NG ▶ **REPLACE TRANSFER SHIFT ACTUATOR ASSEMBLY**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VR05MX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P280713; Pressure Control Solenoid "G" Circuit Open; 2016 MY Tacoma [08/2015 -]		

DTC	**P280713**	**Pressure Control Solenoid "G" Circuit Open**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P280713	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL4 circuit while driving and shifting gears (SL4 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL4 circuit • Shift solenoid valve SL4 • ECM	P2810

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL4 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL4 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P2810: Shift solenoid valve SL4/Range check
Required sensors/Components	Shift solenoid valve SL4
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	More than 100%

Condition (C):

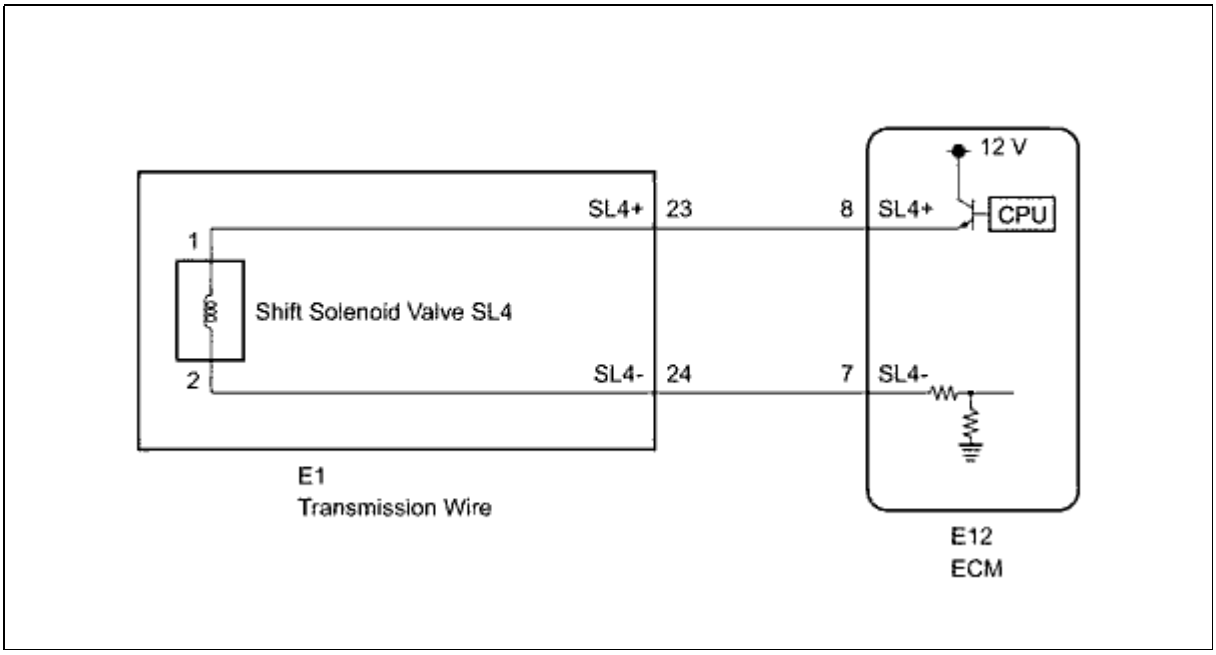
Output duty cycle	Less than 0%

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL4 when the shift lever is in D:

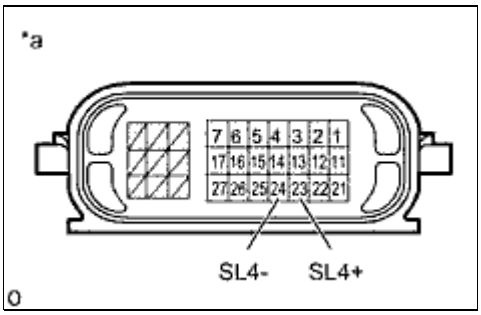
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL4)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
23 (SL4+) - 24 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
23 (SL4+) - Body ground	Always	10 kΩ or higher
24 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

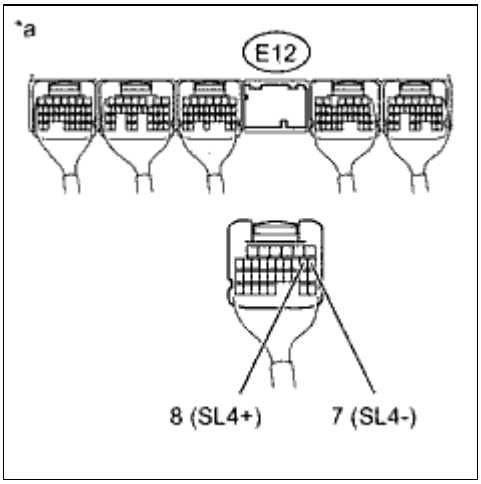
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E12-8 (SL4+) - E12-7 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
E12-8 (SL4+) - Body ground	Always	10 kΩ or higher
E12-7 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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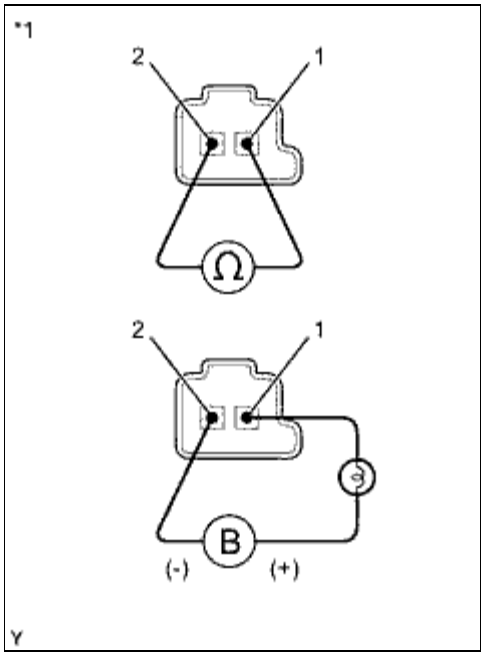
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

(a) Remove shift solenoid valve SL4 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL4

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VQ05TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): P28077F; Pressure Control Solenoid "G" Actuator Stuck Off; 2016 MY Tacoma [08/2015 -]		

DTC	**P28077F**	**Pressure Control Solenoid "G" Actuator Stuck Off**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P28077F	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 3rd or 5th gear is commanded. • The condition that 4th gear is engaged when a shift to 4th gear is commanded occurs twice, and one of the following conditions is met: ○ When a shift to 1st gear is commanded, 3rd gear is engaged. ○ When a shift to 2nd gear is commanded, 3rd gear is engaged. ○ When a shift to 6th gear is commanded, 5th gear is engaged.	• Shift solenoid valve SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)	P2808

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P2808: Shift solenoid valve SL4/OFF malfunction Shift solenoid valve SL4/ON malfunction
Required sensors/Components	Shift solenoid valve SL4, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous

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Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher

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Engine	Running
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction (A):

ECM select gear	3rd
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL4	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
Throttle valve opening angle	3% or more

OFF malfunction (B):

ECM select gear	5th
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL4	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
Throttle valve opening angle	3% or more

OFF malfunction (C):

ECM select gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed of 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (A):

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ECM select gear	1st
Time after transition to 1st gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (B):

ECM select gear	2nd
Time after transition to 2nd gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (C):

ECM select gear	6th
Time after transition to 6th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1

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Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (D):

ECM select gear	4th
Time after transition to 4th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or (C)

OFF malfunction (A):

Turbine speed - Output speed x 3rd gear ratio	1000 rpm or more

OFF malfunction (B):

Turbine speed - Output speed x 5th gear ratio	1000 rpm or more

OFF malfunction (C):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.3

[ON malfunction]

One of the following conditions are met: ON malfunction (A), (B) or (C) and ON malfunction (D) 2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction (A) and (B):

Turbine speed / Output speed when output speed less than 1000 rpm	1.3 to 1.65

ON malfunction (C):

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Turbine speed / Output speed when output speed less than 1000 rpm	0.6376 to 0.7376

ON malfunction (D):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P28077F)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P28077F is output	A
P28077F and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

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2.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Transmission

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	1st/2nd /3rd/4th /5th/6th Start/Stop	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	

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ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P07757F)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P07957F)**

D ▶ **GO TO STEP 3**

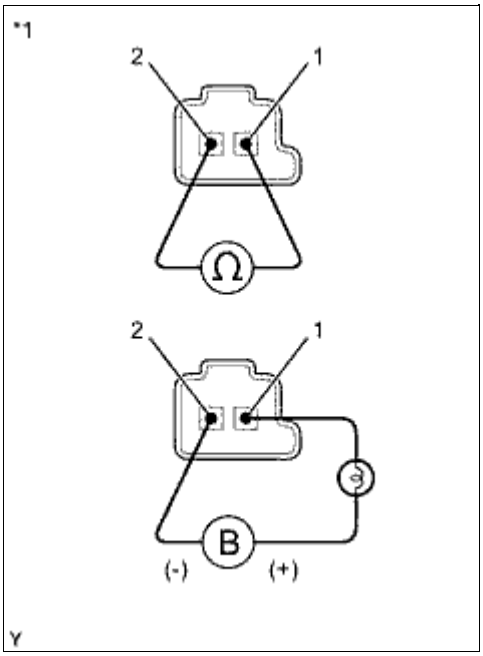
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P27137F)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P07457F)**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

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(a) Remove shift solenoid valve SL4 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL4**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

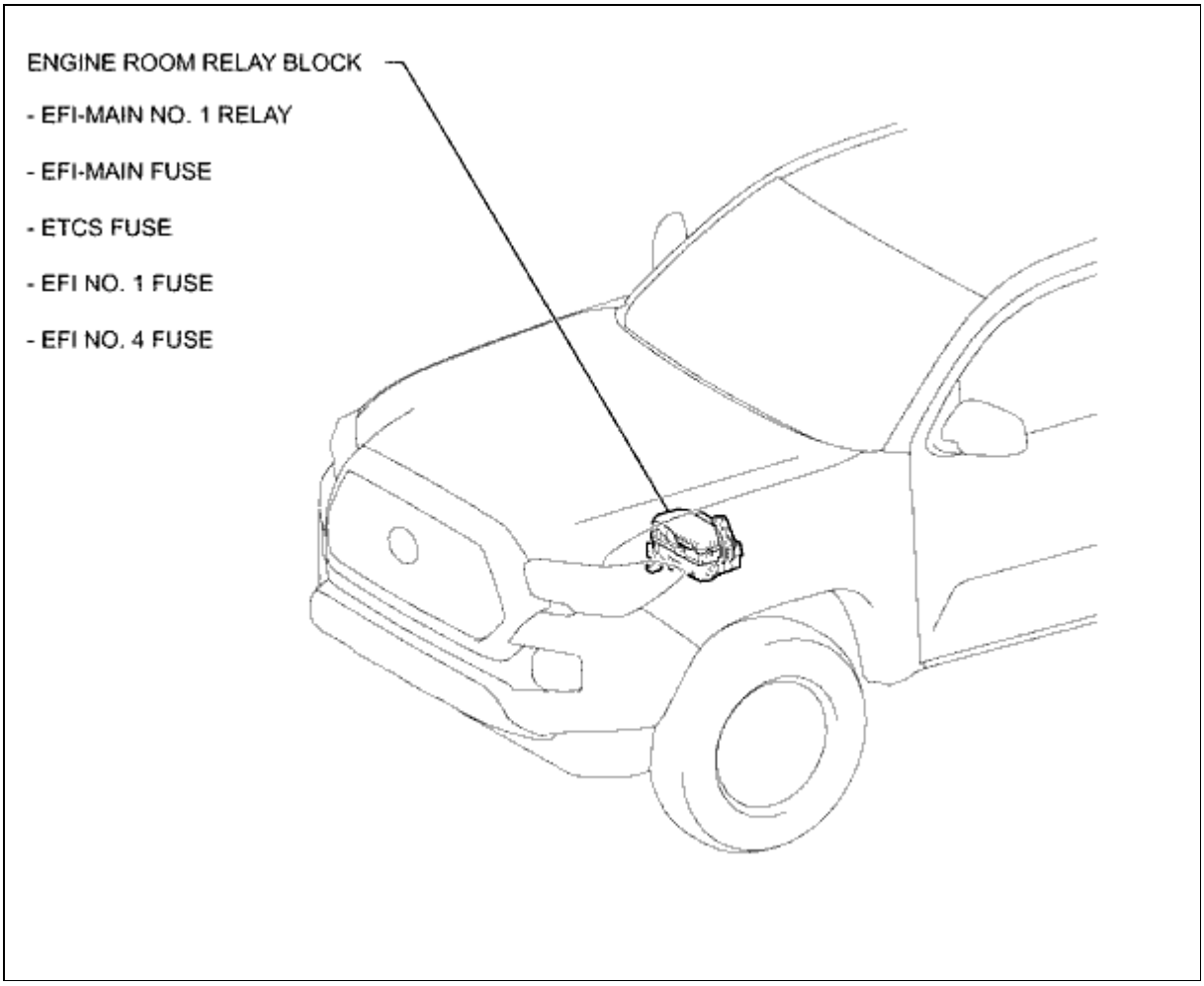
OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 R	**Doc ID:** RM000000W720LHX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): PARTS LOCATION; 2016 MY Tacoma [08/2015 -]		

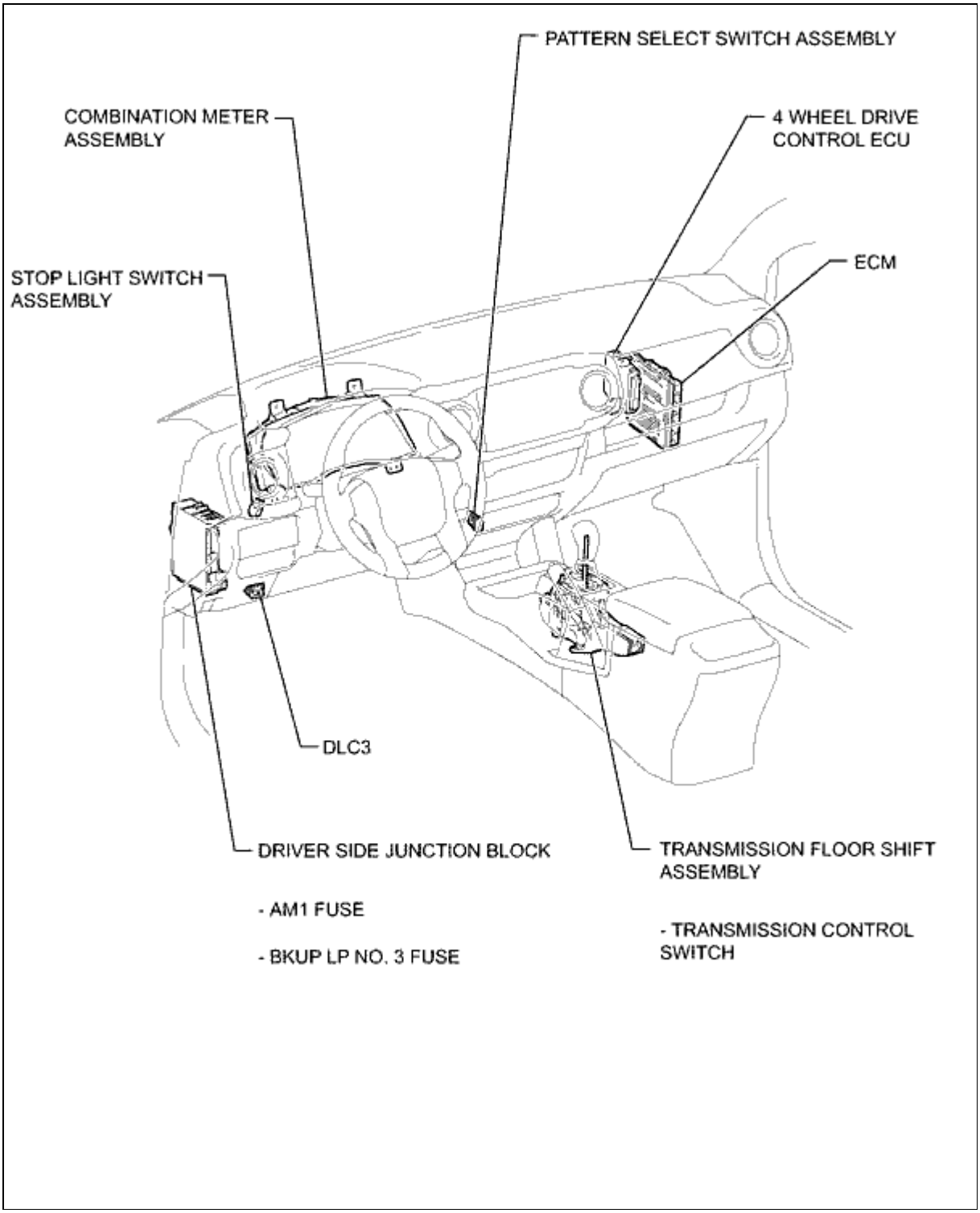
PARTS LOCATION

ILLUSTRATION



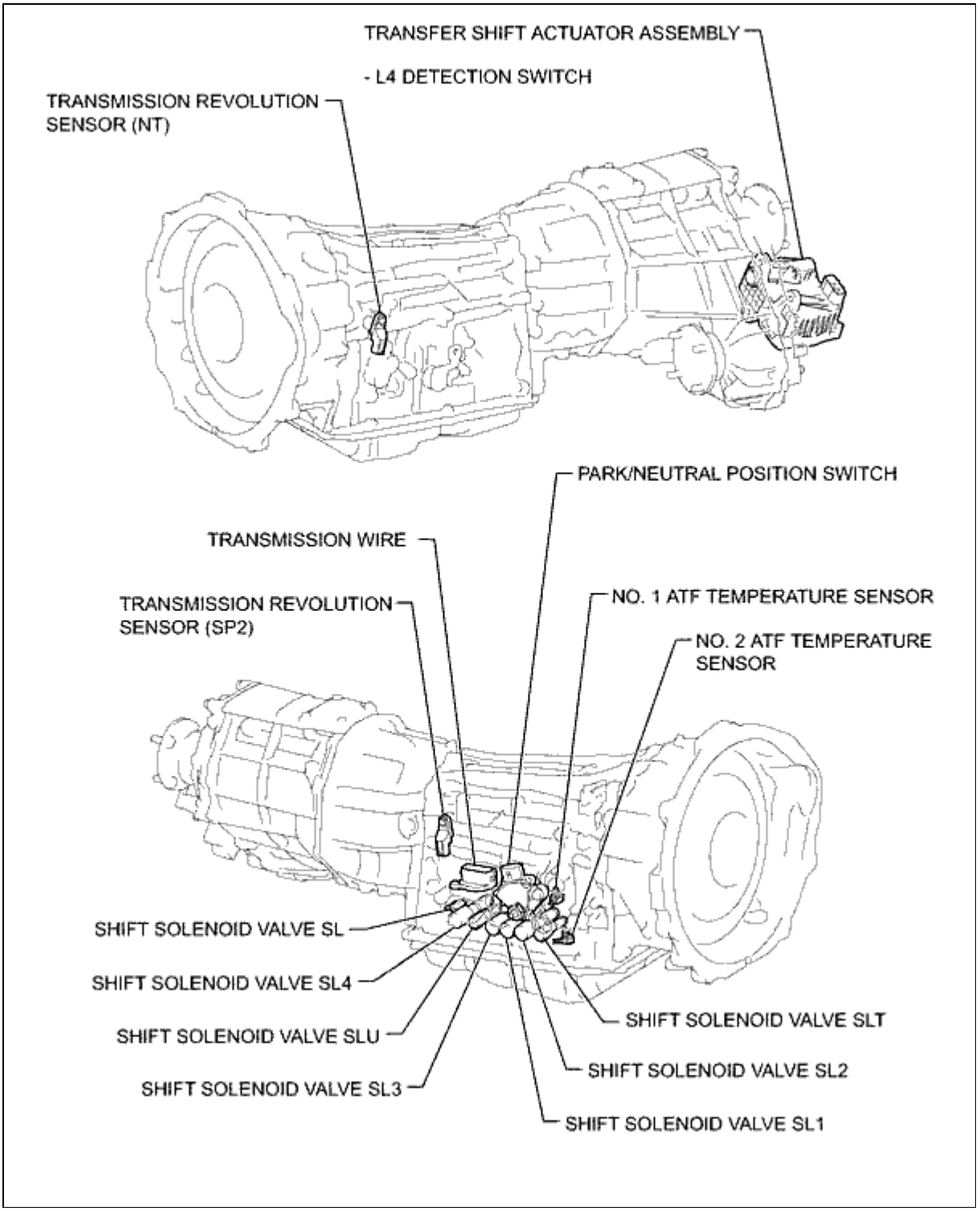
ILLUSTRATION

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Last Modified: 11-13-2015	6.6 L	**Doc ID:** RM000000O7H0ILX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): PRECAUTION; 2016 MY Tacoma [08/2015 -]		

PRECAUTION

1. IGNITION SWITCH EXPRESSION

HINT:

The type of ignition switch used on this model differs depending on the specifications of the vehicle. The expressions listed in the table below are used in this section.

EXPRESSION	IGNITION SWITCH (POSITION)	ENGINE SWITCH (CONDITION)
Ignition Switch off	LOCK	Off (Lock)
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	On (Start)

2. PRECAUTION

NOTICE:

- When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected INFO .
- Perform the Reset Memory procedures (A/T initialization) after replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves INFO .

HINT:

Reset Memory cannot be completed by only reconnecting the cable to the negative (-) battery terminal.

- Perform Registration (VIN registration) when replacing the ECM INFO .

CAUTION:

When using compressed air, always aim away from yourself to prevent Automatic Transmission Fluid (ATF) or kerosene from spraying on your face.

NOTICE:

- The automatic transmission is composed of precision-made parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect performance.
- The procedures are organized so that you work on only one component group at a time. This will help avoid confusion with similar-looking parts of different sub-assemblies being on your workbench at the same time.
- The component groups are inspected and repaired from the converter housing side.
- Whenever possible, complete the inspection, repair and reassembly before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.
- Use of Toyota Genuine ATF WS is recommended.
- All disassembled parts should be washed clean, and compressed air should be blown through any fluid passages and holes.
- Dry all parts with compressed air. Never use cloth.
- The recommended ATF or kerosene should be used for cleaning.
- After cleaning, the parts should be arranged in the order they were removed for efficient inspection,

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repairs and reassembly.

- New discs for the brakes and clutches that will be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
- All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.
- All old gaskets and rubber O-rings must be replaced.
- Do not apply adhesive cement to gaskets and similar parts.
- Make sure that the ends of the snap rings are not aligned with any cutouts. Also make sure that snap rings are correctly installed into the grooves.
- If a worn bushing is to be replaced, the sub-assembly containing the bushing must also be replaced.
- Check the thrust bearings and races for wear or damage. Replace them if necessary.
- Use petroleum jelly to keep parts in place.
- When working with seal packing material, the following must be observed:
    - Using a razor blade and a gasket scraper, remove all the old seal packing material from the gasket surface.
    - Thoroughly clean all components to remove any loose material.
    - Clean both sealing surfaces with a non-residue solvent.
    - Parts must be reassembled within 10 minutes of application. Otherwise, the seal packing material must be removed and reapplied.

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Last Modified: 11-13-2015	6.6 T	**Doc ID:** RM000000W7314FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): PROBLEM SYMPTOMS TABLE; 2016 MY Tacoma [08/2015 -]		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- The Matrix Chart is divided into 2 chapters. When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to 2, proceed as instructed.
- If the instruction "Proceed to Next Suspected Area Shown in Problem Symptoms Table" is given in the flowchart for each circuit, proceed to the next suspected area in the table.
- If the problem still occurs even though there are no malfunctions in any of the circuits, check the ECM and replace it if necessary.
- *: When the circuit is defective, a DTC may be output.

1. Chapter 1: Electronic Circuit Matrix Chart

SYMPTOM	SUSPECTED AREA	SEE PAGE
No up-shift (1st to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No up-shift (2nd to 3rd)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No up-shift (3rd to 4th)	Shift solenoid valve SL2 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (4th to 5th)	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (5th to 6th)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No down-shift (6th to 5th)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
No down-shift (5th to 4th)	Shift solenoid valve SL1 circuit*	INFO
	ECM	INFO
No down-shift (4th to 3rd)	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (3rd to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (2nd to 1st)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No lock-up or no lock-up off	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	Stop light switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO INFO
	ECM	INFO
Shift point too high or too low	Throttle position sensor circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Park/neutral position switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO INFO
	Pattern select switch power mode circuit	INFO
	ECM	INFO
No gear change by moving shift lever to "+" or "-" while in S	Transmission control switch circuit	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Harsh engagement (N to D)	Shift solenoid valve SLT circuit*	INFO
	ECM	INFO
Harsh engagement (Any driving position)	Throttle position sensor circuit*	INFO
	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO INFO
	ECM	INFO
Harsh engagement (Lock-up)	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	ECM	INFO
Poor acceleration	Shift solenoid valve SLT circuit*	INFO
	No. 2 ATF temperature sensor circuit*	INFO INFO
	ECM	INFO
Shifting malfunction (Vehicle is stuck in 3rd or 5th gear)	ECM power source circuit	INFO
Changing gears takes time when up-shifting	Shift solenoid valve SL circuit*	INFO INFO
No engine braking	ECM	INFO
No kick-down	ECM	INFO
Slip or shudder (5th to 6th and 6th to 5th)	Shift solenoid valve SL circuit*	INFO INFO
ATF temperature warning indicator remains on	No. 2 ATF temperature sensor circuit*	INFO INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Lock-up in 3rd gear	No. 2 ATF temperature sensor circuit*	INFO INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
Vehicle moves forward with shift lever in N	Park/neutral position switch circuit*	INFO
	ECM	INFO
Engine stalls when starting off or stopping	Shift solenoid valve SLU circuit*	INFO
	ECM	INFO
Shifting malfunction	Park/neutral position switch circuit*	INFO
	Transmission control switch circuit	INFO
	ECM	INFO

2. Chapter 2: On-Vehicle Repair and Off-Vehicle Repair

SYMPTOM	SUSPECTED AREA	SEE PAGE
Vehicle does not move when shift lever is in any forward position or reverse position	Transmission control cable	INFO
	Manual valve	INFO
	Parking lock pawl	INFO
	Rear planetary gear unit	INFO
	Torque converter assembly	INFO
Vehicle does not move with shift lever in R	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
No up-shift (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	Shift solenoid valve SL2*	INFO
No up-shift (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL1*	INFO
No up-shift (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
No down-shift (6th to 5th)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (5th to 4th)	Shift solenoid valve SL1*	INFO
	No. 1 clutch (C1)	INFO
	Valve body assembly	INFO
No down-shift (4th to 3rd)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL2*	INFO
	Valve body assembly	INFO
No down-shift (3rd to 2nd)	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (2nd to 1st)	Valve body assembly	INFO
	Shift solenoid valve SL3*	INFO
No lock-up or No lock-up off	Valve body assembly	INFO
	Torque converter assembly	INFO
Harsh engagement (N to D)	Valve body assembly	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	Shift solenoid valve SL1*	INFO
Harsh engagement (Lock-up)	Valve body assembly	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	Torque converter assembly	INFO
	Shift solenoid valve SLU*	INFO
Harsh engagement (N to R)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (1st to 2nd to 3rd to 4th to 5th to 6th)	Valve body assembly	INFO
	Shift solenoid valve SLT*	INFO
Harsh engagement (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO
	Shift solenoid valve SL2*	INFO
Harsh engagement (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (6th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Slip or shudder (forward and reverse, after warm-up)	Transmission control cable	INFO
	Valve body assembly	INFO
	Oil strainer	INFO
	No. 1 brake (B1)	INFO
	No. 2 brake (B2)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	No. 3 brake (B3)	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
	Torque converter assembly	INFO
Slip or shudder (particular position, just after engine starts)	Torque converter assembly	INFO
Slip or shudder (shift lever in R)	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
Slip or shudder (1st)	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (2nd)	No. 1 brake (B1)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (3rd)	No. 3 brake (B3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (4th)	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (5th)	No. 3 brake (B3)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO
No engine braking (1st to 4th, shift lever in S)	No. 1 clutch (C1)	INFO
No engine braking (1st)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 1 clutch (C1)	INFO
No kick-down	Valve body assembly	INFO
Shift point too high or too low	Valve body assembly	INFO
Poor acceleration (All positions)	Valve body assembly	INFO
	Torque converter assembly	INFO
Poor acceleration (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Engine stalls when starting off or stopping	Front planetary gear unit	INFO
	Valve body assembly	INFO
	Torque converter assembly	INFO

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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): Pattern Select Switch Power Mode Circuit; 2016 MY Tacoma [08/2015 -]		

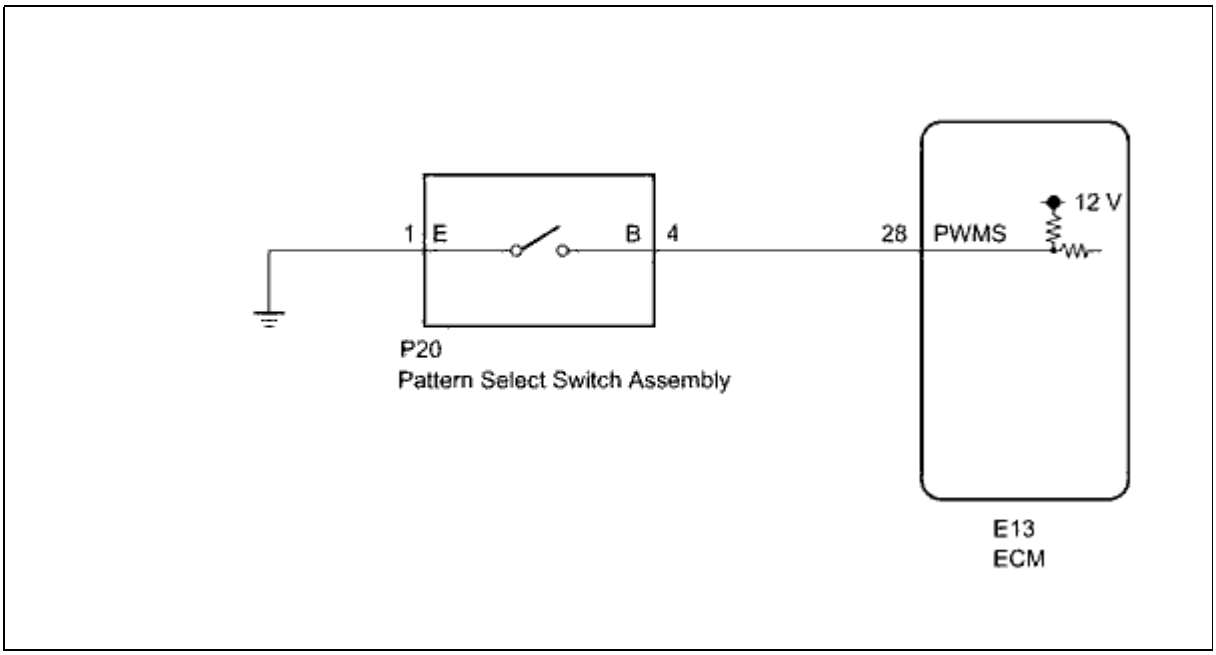
Pattern Select Switch Power Mode Circuit

DESCRIPTION

The ECM memory contains the programs for the normal and PWR shift patterns.

By following the programs corresponding to the signals from the pattern select switch assembly, park/neutral position switch and other various sensors, the ECM switches the shift solenoid valves on and off, and controls the transmission gear ratio.

WIRING DIAGRAM



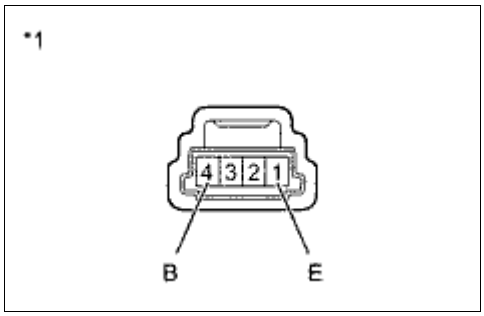
INSPECTION PROCEDURE

PROCEDURE

1.	**INSPECT PATTERN SELECT SWITCH ASSEMBLY**

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(a) Remove the pattern select switch assembly INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 (E) - 4 (B)	Pattern select switch assembly pushed	Below 1 Ω
1 (E) - 4 (B)	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

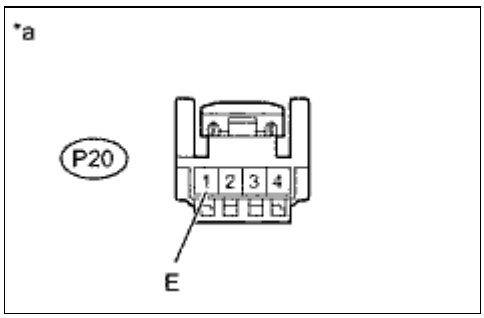
*1	Pattern Select Switch Assembly

NG ▶ **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - BODY GROUND)**

(a) Disconnect the pattern select switch assembly connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P20-1 (E) - Body ground	Always	Below 1 Ω

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Text in Illustration

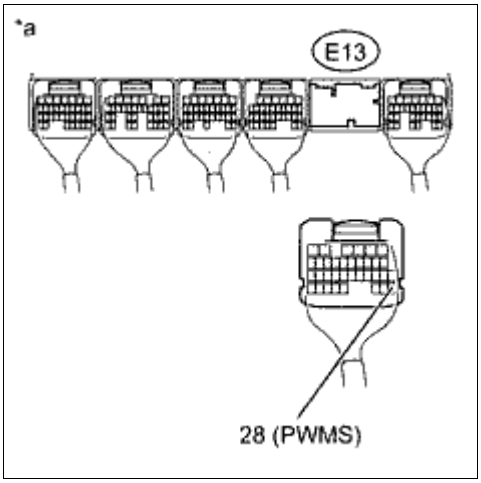
*a	Front view of wire harness connector (to Pattern Select Switch Assembly)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
E13-28 (PWMS) - Body ground	Pattern select switch assembly pushed	Below 1 Ω
E13-28 (PWMS) - Body ground	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): ROAD TEST; 2016 MY Tacoma [08/2015 -]		

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

(a) Based on the result of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transmission does not shift up or down, or that the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and attempt to duplicate the problem symptoms.

2. ROAD TEST

(a) Perform a road test.

CAUTION:

Check for safety before performing any tests.

NOTICE:

- Be sure to inspect and adjust the engine before performing these tests.
- Perform the road test with the engine coolant temperature is 70°C (158°F) or higher and the ATF temperature between 40 and 110°C (104 and 230°F).
- Perform these tests with the air conditioning and cruise control off.

INSPECTION	PROCEDURE
Transmission Control Switch Test	With the vehicle stationary and the shift lever in D, move the shift lever to S and return it to D. Check that the meter display changes from D to the appropriate S range and then back again.
S Position Test	With the vehicle stationary and the shift lever in S, move the shift lever to "+" and "-". Check that the meter display changes between S ranges properly.
D Position Shift Test	While driving the vehicle normally, check that the transmission shifts up and down through each gear properly.
Lock-up Function	While driving on a level surface at a constant speed in the lock-up range with the shift lever in D, lightly depress the accelerator pedal and check that the engine speed does not change abruptly.
P Position Test	Stop the vehicle on an incline (approximately 5° or more). Then move the shift lever to P and release the parking brake. Check that the parking lock pawl holds the vehicle in place.
Abnormal Noise and Vibration	Check for abnormal noise and vibration while driving the vehicle forward and backward, and during shift operations.
Fluid Leakage	After performing all other road test inspections, check for fluid leakage.

HINT:

When checking for DTCs after a repair, drive the vehicle according to the monitor drive pattern INFO .

(b) Shift schedule confirmation

(1) Connect the Techstream to the DLC3.

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(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Transmission / Data List / Vehicle Speed, Accel Position from EFI and Shift Status.

(5) Check that the "Shift Status" changes in accordance with the "Vehicle Speed" as shown in the following table.

Shift Schedule Chart

ACCELERATOR POSITION	6%				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	10 to 15 km/h (6 to 9 mph)	20 to 30 km/h (12 to 19 mph)	30 to 40 km/h (19 to 25 mph)	45 to 55 km/h (28 to 34 mph)	60 to 75 km/h (37 to 47 mph)

NOTICE:

- All vehicle speeds indicated in the above table are actual values. Therefore, if checking a shift point with a chassis dynamometer, keep in mind that there is a margin of error in the chassis dynamometer indication.
- If checking a shift point against the vehicle speed indicated on the speedometer, remember to consider the speedometer correction rate and margin of error in the Techstream indication.

(c) Lock-up confirmation

(1) Connect the Techstream to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Transmission / Data List / Vehicle Speed, Engine Speed, Accel Position from EFI, NT Sensor Speed, A/T Oil Temperature 1, Lock Up Status and Shift Status.

(5) When the following conditions are met, check that the difference between "Engine Speed" and "NT Sensor Speed" is 50 rpm or less.

Lock-up Schedule

Accel Position from EFI	6%
Vehicle Speed	80 km/h (50 mph) or more
Shift Status	6th gear
Lock Up Status	ON

HINT:

Lock-up prohibition conditions:

- A/T oil temperature is below 40°C (104°F)
- Engine coolant temperature is below 70°C (158°F)
- Shift range between "1" (S1 range) and "3" (S3 range)
- Accelerator pedal is fully released
- Stop light switch signal is on

(d) Manual down-shift permission speed

(1) Manual down-shift is permitted for each shift status when the vehicle speed is below the corresponding range shown in the following table.

Manual Down-shift Permission Speed Chart

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SHIFT STATUS (SHIFT LEVER IN S)	S6 TO S5	S5 TO S4	S4 TO S3	S3 TO S2	S2 TO S1
Vehicle Speed	280 to 305 km/h (174 to 190 mph)	190 to 210 km/h (118 to 130 mph)	125 to 145 km/h (78 to 90 mph)	90 to 100 km/h (56 to 62 mph)	40 to 50 km/h (25 to 31 mph)

(e) Shift schedule when accelerator pedal is fully depressed

Shift Schedule Chart

ACCELERATOR PEDAL	FULLY DEPRESSED				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	45 to 55 km/h (28 to 34 mph)	90 to 105 km/h (56 to 65 mph)	130 to 150 km/h (81 to 93 mph)	210 to 230 km/h (130 to 143 mph)	305 to 330 km/h (190 to 205 mph)

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W750THX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): SYSTEM DESCRIPTION; 2016 MY Tacoma [08/2015 -]		

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The Electronic Controlled Automatic Transmission (ECT) is an automatic transmission that has its shift timing electronically controlled by the ECM. The ECM detects electrical signals that indicate engine and driving conditions, and controls the shift point, based on driver's habits and road conditions. As a result, fuel efficiency and transmission performance are improved.

Shift shock has been reduced by controlling the engine and transmission simultaneously.

In addition, the ECT has features such as:

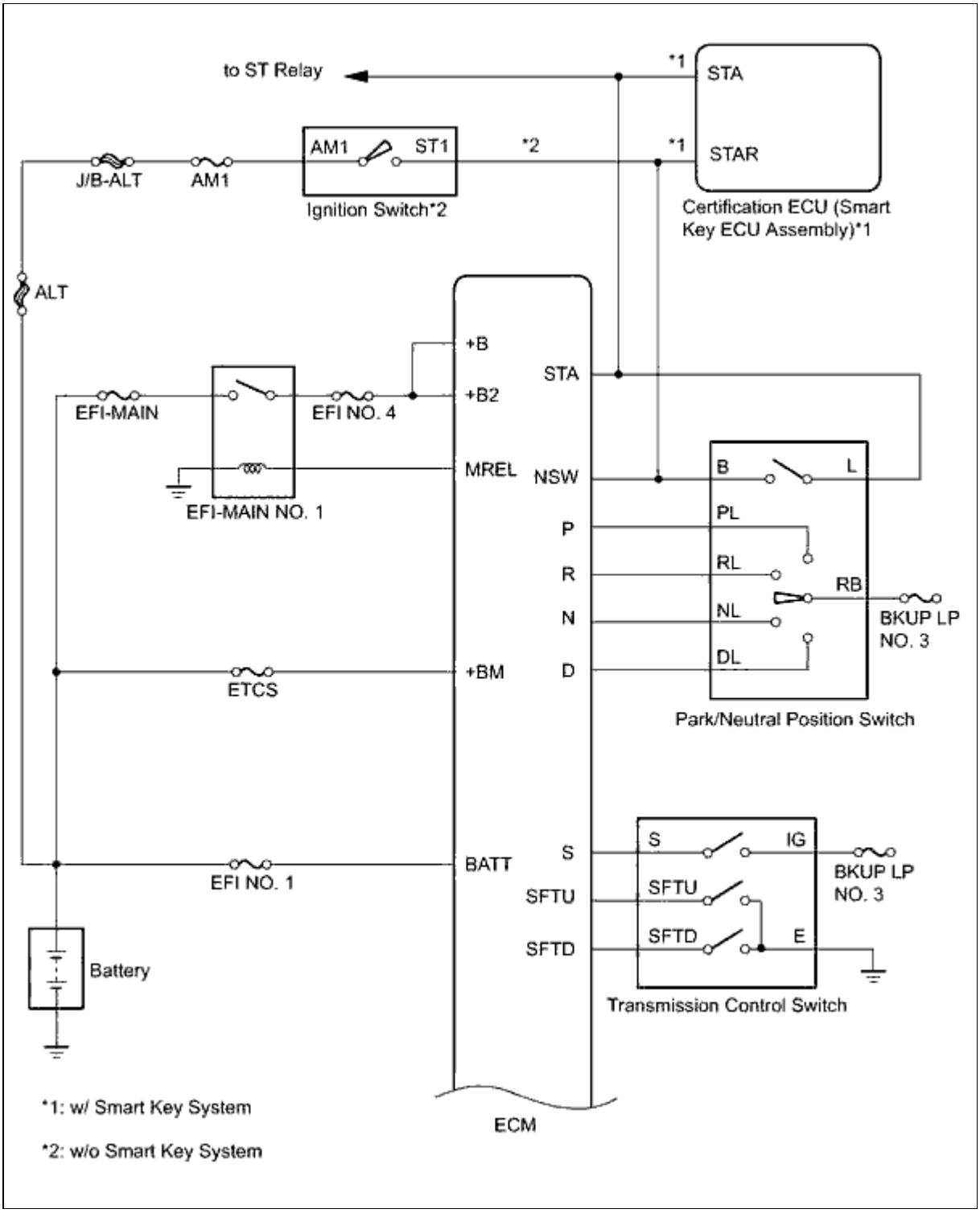
- Diagnostic function.
- Fail-safe function for use when a malfunction occurs.

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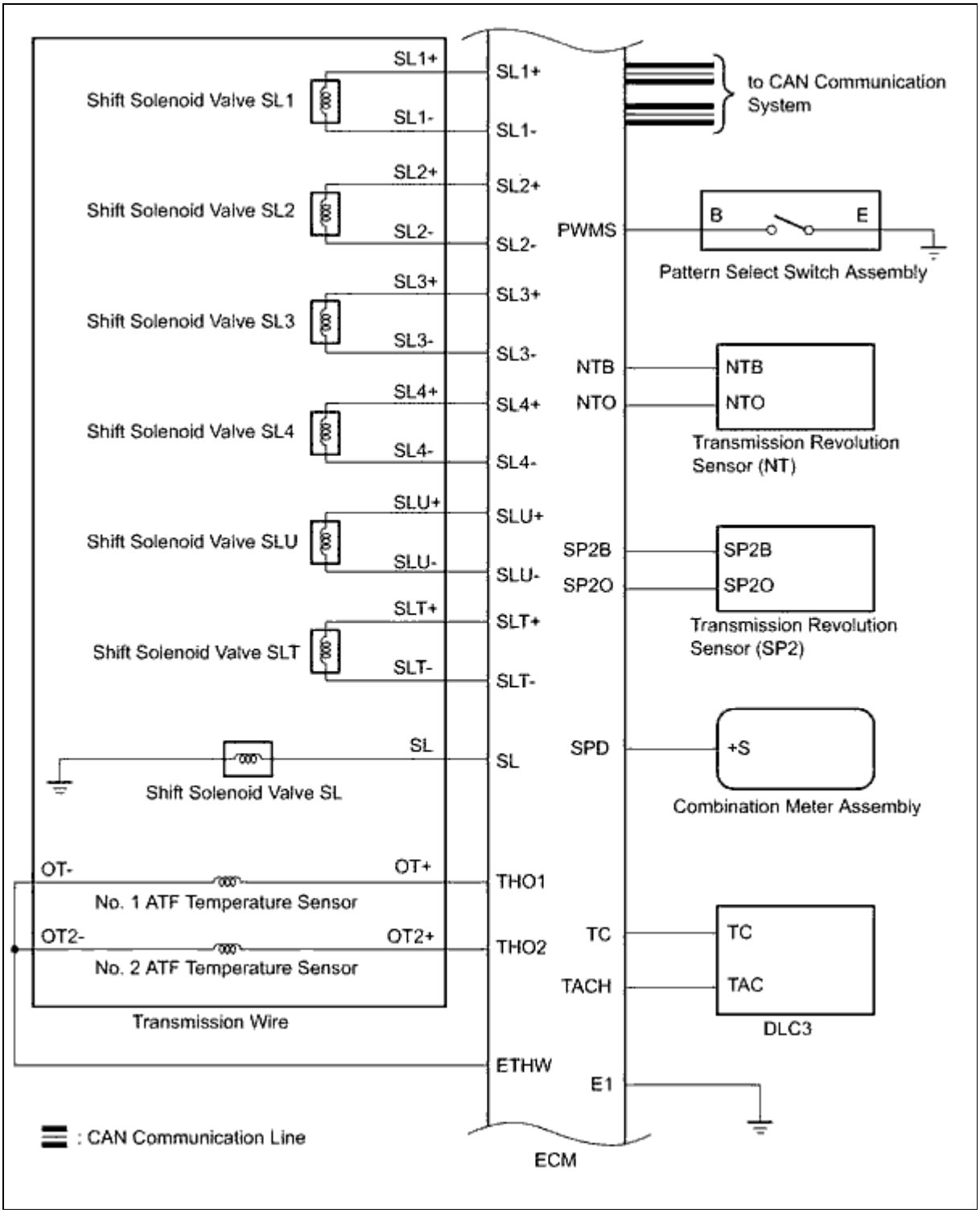
Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7D0LTX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): SYSTEM DIAGRAM; 2016 MY Tacoma [08/2015 -]		

SYSTEM DIAGRAM

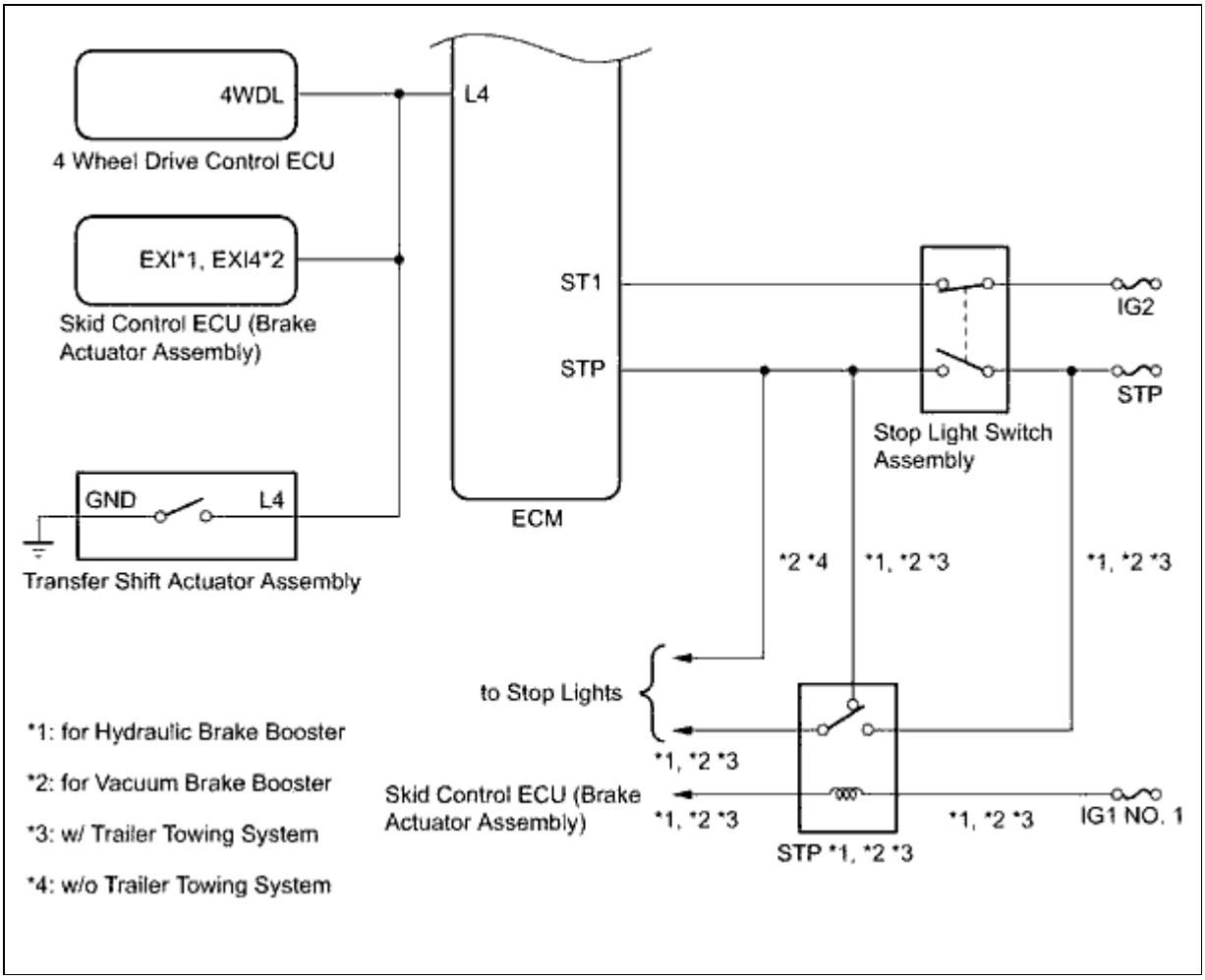
The configuration of the electronic control system in the AC60F automatic transmission is as shown in the following chart.



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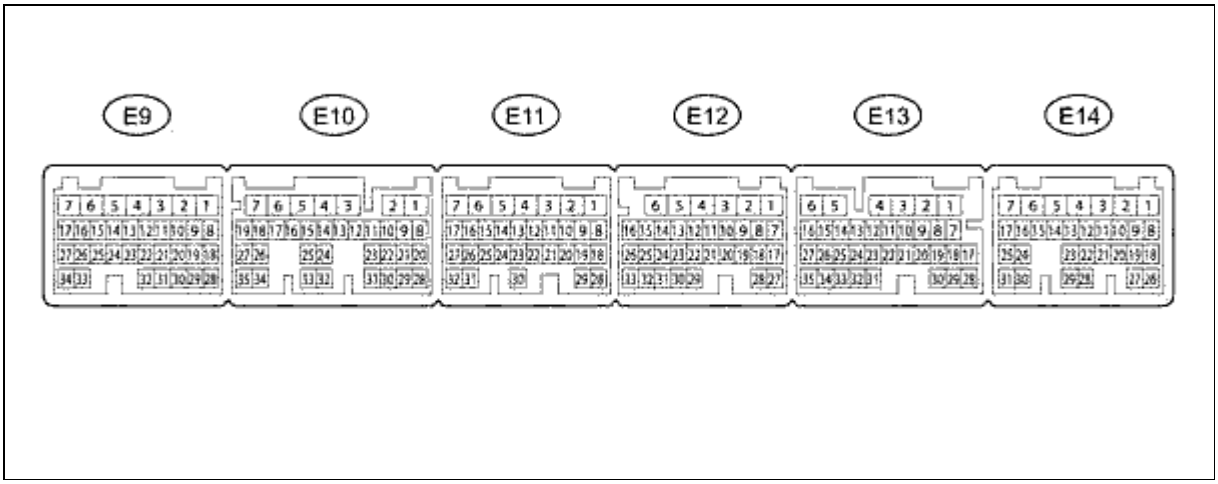


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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000137007AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): TERMINALS OF ECM; 2016 MY Tacoma [08/2015 -]		

TERMINALS OF ECM

1. ECM



HINT:

The standard voltage between each pair of ECM terminals is shown in the table below. In the table, first follow the information under "Condition". Look under "Terminal No. (Symbol)" for the terminals to be inspected. The standard voltage between the terminals is shown under "Specified Condition".

Use the illustration above as a reference for the ECM terminals.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E10-26 (THO1) - E9-23 (ETHW)	P - BR	No. 1 ATF temperature sensor signal	No. 1 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E10-34 (THO2) - E9-23 (ETHW)	L - BR	No. 2 ATF temperature sensor signal	No. 2 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E11-9 (SL1+) - E11-8 (SL1-)	R - V	Shift solenoid valve SL1 signal	1st, 2nd, 3rd or 4th gear	Pulse generation
13-11 (SLU+) - E13-10 (SLU-)	P - L	Shift solenoid valve SLU signal	2nd, 3rd, 4th, 5th or 6th gear (Flex lock-up on)	Pulse generation
E11-13 (SLT+) - E11-12 (SLT-)	LG - Y	Shift solenoid valve SLT signal	Engine idling	Pulse generation
E12-8 (SL4+) - E12-7 (SL4-)	SB - BE	Shift solenoid valve SL4 signal	3rd or 5th gear	Pulse generation
E12-14 (SL3+) - E12-13 (SL3-)	B - W	Shift solenoid valve SL3 signal	2nd or 6th gear	Pulse generation
E12-15 (SL) - E11-1 (E1)	R - W-B	Shift solenoid valve SL signal	All gears	11 to 14 V

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E12-17 (R) - E11-1 (E1)	V - W-B	R shift position switch signal	Ignition switch ON and shift lever in R	11 to 14 V
			Ignition switch ON and shift lever not in R	Below 1 V
E12-18 (P) - E11-1 (E1)	GR - W-B	P shift position switch signal	Ignition switch ON and shift lever in P	11 to 14 V
			Ignition switch ON and shift lever not in P	Below 1 V
E12-20 (SL2+) - E12-19 (SL2-)	GR - BE	Shift solenoid valve SL2 signal	4th, 5th or 6th gear	Pulse generation
E12-26 (SP2B) - E11-1 (E1)	G - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E12-27 (D) - E11-1 (E1)	R - W-B	D shift position switch signal	Ignition switch ON and shift lever in D, S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in D, S, "+" or "-"	Below 1 V
E12-28 (N) - E11-1 (E1)	G - W-B	N shift position switch signal	Ignition switch ON and shift lever in N	11 to 14 V
			Ignition switch ON and shift lever not in N	Below 1 V
E12-31 (NTO) - E11-1 (E1)	W - W-B	Transmission revolution sensor (NT) signal	Engine idling	Pulse generation
E12-32 (NTB) - E11-1 (E1)	Y - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E12-33 (SP2O) - E11-1 (E1)	L - W-B	Transmission revolution sensor (SP2) signal	Vehicle driving	Pulse generation
E13-7 (SFTD) - E11-1 (E1)	R - W-B	Down-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "-" (Down-shift)	Below 1 V
E13-8 (SFTU) - E11-1 (E1)	G - W-B	Up-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "+" (Up-shift)	Below 1 V
E13-12 (STA) - E11-1 (E1)	Y - W-B	Starter assembly signal	Cranking	6 V or higher
E13-13 (NSW) - E11-1 (E1)	V - W-B	Park/neutral position switch signal	Ignition switch ON and shift lever in P or N	Below 1 V
			Ignition switch ON and shift lever not in P or N	11 to 14 V
E13-16 (STP) -	P - W-B	Stop light switch assembly	Brake pedal depressed	7.5 to 14 V

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E11-1 (E1)		signal	Brake pedal released	0 to 1.5 V
E13-22 (L4) - E11-1 (E1)	GR - W-B	L4 position signal	Ignition switch ON and transfer in L4	Below 1.5 V
			Ignition switch ON and transfer not in L4	11 to 14 V
E13-24 (SPD) - E11-1 (E1)	R - W-B	Vehicle speed signal	Vehicle being driven	Pulse generation
E13-27 (CANH) - E11-1 (E1)	B - W-B	CAN communication line	Ignition switch ON	Pulse generation
E13-28 (PWMS) - E11-1 (E1)	P - W-B	Pattern select switch signal	Ignition switch ON and pattern select switch pushed	Below 1 V
			Ignition switch ON and pattern select switch not pushed	11 to 14 V
E13-32 (S) - E11-1 (E1)	P - W-B	S shift position switch signal	Ignition switch ON and shift lever in S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in S, "+" or "-"	Below 1 V
E13-35 (CANL) - E11-1 (E1)	W - W-B	CAN communication line	Ignition switch ON	Pulse generation
E14-2 (BATT) - E11-1 (E1)	L - W-B	Battery (for measuring battery voltage and for ECM memory)	Always	11 to 14 V





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Last Modified: 11-13-2015	6.6 J	**Doc ID:** RM000000WP10KSX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): Transmission Control Switch Circuit; 2016 MY Tacoma [08/2015 -]		

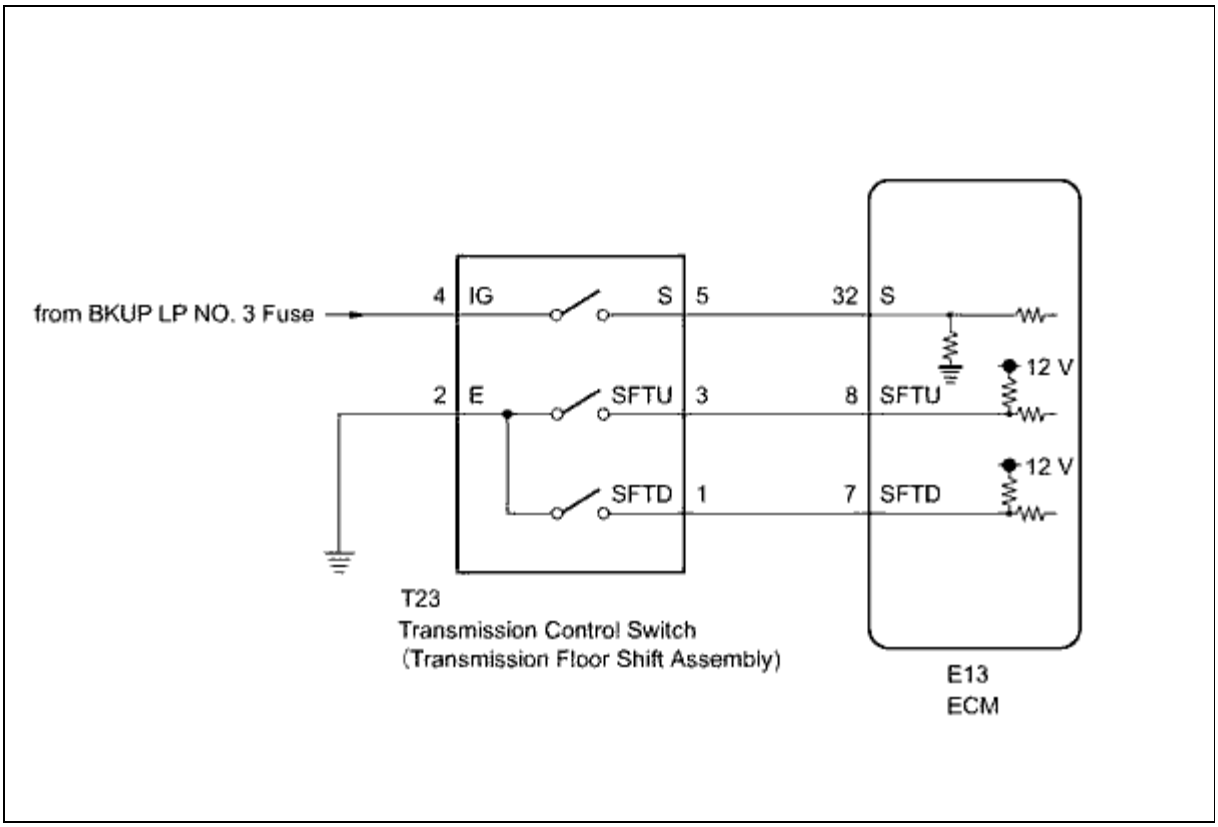
Transmission Control Switch Circuit

DESCRIPTION

After moving the shift lever to S, it is possible to switch the shift range between "1" (S1 range) and "6" (S6 range) using the transmission control switch.

Moving the shift lever to "+" once raises the shift range by one, and moving the shift lever to "-" once lowers the shift range by one.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SHIFT SW STATUS (S RANGE))**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Shift SW Status (S Range)	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-

Result

RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 6**

A ▼

2.	**READ VALUE USING TECHSTREAM (SPORTS SHIFT UP SW AND SPORTS SHIFT DOWN SW)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Shift Up SW	Sport shift up switch status/ ON or OFF	• ON: Shift lever held in "+" (up-shift) • OFF: Shift lever not held in "+" (up-shift)	-
Sports Shift Down SW	Sport shift down switch status/ ON or OFF	• ON: Shift lever held in "-" (down-shift) • OFF: Shift lever not held in "-" (down-shift)	-

Result

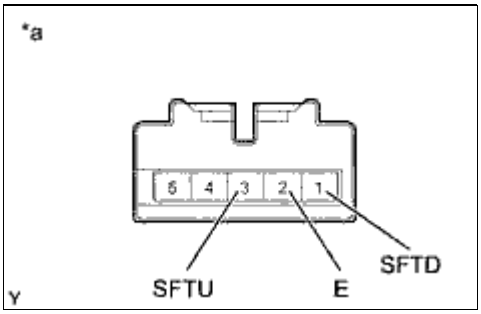
RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 3**

A ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

3.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever held in "+" (Up-shift)	Below 1 Ω
1 (SFTD) - 2 (E)	Shift lever held in "-" (Down-shift)	Below 1 Ω

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever not held in "+"	10 kΩ or higher
1 (SFTD) - 2 (E)	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

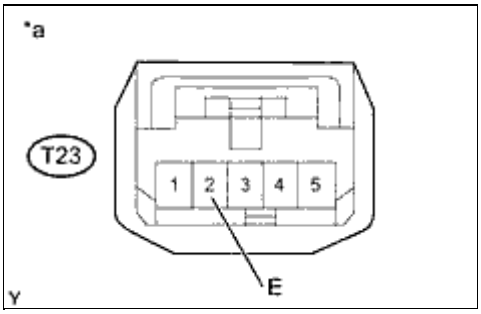
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

4.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - BODY GROUND)**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-2 (E) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

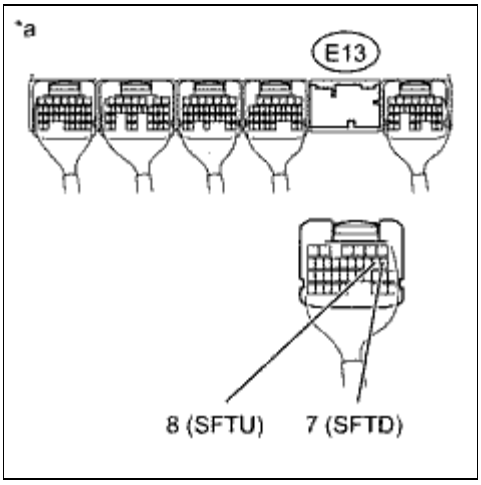
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

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5.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E13-8 (SFTU) - Body ground	Shift lever held in "+" (Up-shift)	Below 1 Ω
E13-7 (SFTD) - Body ground	Shift lever held in "-" (Down-shift)	Below 1 Ω
E13-8 (SFTU) - Body ground	Shift lever not held in "+"	10 kΩ or higher
E13-7 (SFTD) - Body ground	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

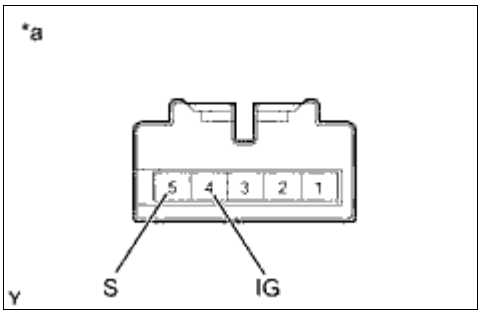
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

6.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

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(a) Disconnect T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "- "	Below 1 Ω
4 (IG) - 5 (S)	Shift lever not in S, "+" or "-"	10 kΩ or higher

Text in Illustration

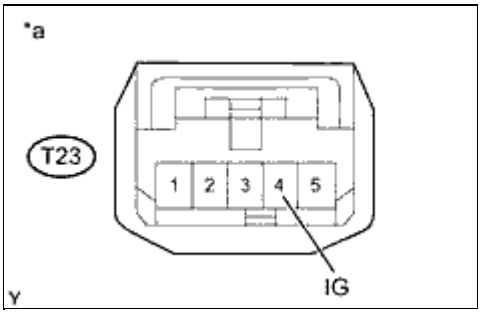
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

7.	**CHECK HARNESS AND CONNECTOR (BATTERY - TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY))**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T23-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
T23-4 (IG) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

8.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - ECM)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-5 (S) - E13-32 (S)	Always	Below 1 Ω
T23-5 (S) - Body ground	Always	10 kΩ or higher
E13-32 (S) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001RRQ09LX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2GR-FKS): U010087; Lost Communication with ECM/PCM "A" Missing Message; 2016 MY Tacoma [08/2015 -]		

DTC	**U010087**	**Lost Communication with ECM/PCM "A" Missing Message**

DESCRIPTION

The engine control unit and the transmission control unit are located inside the ECM. The engine control unit intercommunicates with the transmission control unit with the Controller Area Network (CAN).

If there is a problem in this intercommunication, the ECM stores a DTC.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
U010087	All conditions are met for 1.25 seconds or more (1-trip detection logic): (A) The ignition switch is ON and battery voltage is 9.5 V or higher. (B) There is no communication between the engine control unit and transmission control unit.	ECM	U0100

MONITOR STRATEGY

Related DTCs	U0100: Verify communication
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1.25 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
Battery Voltage	9.5 V or higher
Ignition Switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Communication signal	Lost communication with engine control unit

INSPECTION PROCEDURE

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NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Check the battery voltage is 9.5 V or higher.
2. Turn the ignition switch ON.
3. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK DTC OUTPUT (IN ADDITION TO DTC U010087)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only U010087 is output	A
U010087 and other DTCs are output	B

B ▶ **GO TO DTC CHART**

A ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W780X5X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): CHECK MODE PROCEDURE; 2016 MY Tacoma [08/2015 -]		

CHECK MODE PROCEDURE

1. DESCRIPTION

(a) Check mode has a higher sensitivity to malfunctions and can detect malfunctions that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect. In check mode, DTCs are detected with 1 trip detection logic.

2. CHECK MODE PROCEDURE

(a) Make sure that the following conditions are met:

(1) Battery positive voltage 11 V or higher.

(2) Throttle valve fully closed.

(3) Shift lever in P or N.

(4) Air conditioning off.

(b) Turn the ignition switch off.

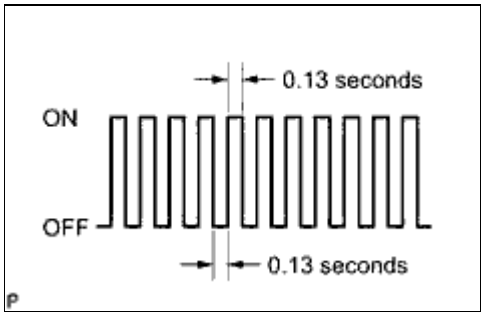
(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Utility / Check Mode.

(g) Change the ECM to check mode. Make sure the MIL flashes as shown in the illustration.



NOTICE:

All DTCs and freeze frame data will be cleared if: 1) the Techstream is used to change the ECM from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or off.

Before entering check mode, make notes of the DTCs and freeze frame data.

(h) Start the engine. The MIL should turn off after the engine starts.

(i) Perform Monitor Drive Pattern for the ECT test INFO .

(Or, simulate the conditions of the malfunction described by the customer.)

(j) After simulating the malfunction conditions, use the Techstream to check the DTC and freeze frame data.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7E0ZNX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DATA LIST / ACTIVE TEST; 2016 MY Tacoma [08/2015 -]		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	-
Engine Speed	Engine speed/ Min.: 0 rpm Max.: 16384 rpm	600 to 700 rpm: Idling	-
Coolant Temp	Engine coolant temperature/ Min.: -40°C (-40°F) Max.: 140°C (284°F)	80 to 100°C (176 to 212°F): After warming up	• If value -40°C (-40°F): sensor circuit open • If value 140°C (284°F): sensor circuit shorted
Battery Voltage	Battery voltage/ Min.: 0 V Max.: 66.000 V	11 to 14 V: Ignition switch ON	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Accelerator Position	Accelerator pedal position/ Min.: 0% Max.: 399.9%	Actual accelerator pedal position	-
N Range Status	Shift lever N status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	-
Neutral Position SW Signal	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Transfer L4	Transfer status/ ON or OFF	• ON: Transfer in L4 • OFF: Transfer not in L4	-
Stop Light Switch	Stop light switch status/ ON or OFF	• ON: Brake pedal depressed • OFF: Brake pedal released	-
SPD (NT)	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm.
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P • OFF: Shift lever not in P	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Pattern Switch (PWR/M)	PWR mode status/ ON or OFF	• ON: PWR mode on • OFF: PWR mode off	-
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in R	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
Shift SW Status (N, P Range) Supported	Status of park/neutral position switch (N or P) supported/ Supp or Unsupp	-	-
Shift SW Status (N, P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	-
Sports Shift Up SW	Sport shift up switch status/ ON or OFF	• ON: Shift lever held in "+" (up-shift) • OFF: Shift lever not	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
		held in "+" (up-shift)	
Sports Shift Down SW	Sport shift down switch status/ ON or OFF	• ON: Shift lever held in "-" (down-shift) • OFF: Shift lever not held in "-" (down-shift)	-
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect. **HINT:** When the failure still occurs even after adjusting these parts, INFO .
A/T Oil Temperature 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.
A/T Oil Temperature 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.
ATF Thermal Degradation Estimate	Estimated value of ATF thermal degradation/ Min.: 0 Max.: 65535	-	If 50000 or more is displayed for the Data List item "ATF Thermal Degradation Estimate", thermal degradation of the ATF is suspected. Perform ATF Thermal Degradation Estimate Reset after replacing the ATF.
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V	0.1 to 1.9 V: Engine idling	-

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Max.: 4.999 V		
SP2 Sensor Voltage	Transmission revolution sensor (SP2) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-
Lock Up	Lock up/ ON or OFF	• ON: Lock-up operating • OFF: Lock-up not operating	-
Shift Status	ECM gear shift command/ 1st, 2nd, 3rd, 4th, 5th or 6th	Same as actual gear	-
SLT Solenoid Status	Shift solenoid valve SLT status/ ON or OFF	• ON: Shift solenoid valve SLT operating • OFF: Shift solenoid valve SLT not operating	-
SLU Solenoid Status	Shift solenoid valve SLU status/ ON or OFF	• ON: Shift solenoid valve SLU operating • OFF: Shift solenoid valve SLU not operating	-
SL Solenoid Status	Shift solenoid valve SL status/ ON or OFF	• ON: Shift solenoid valve SL operating • OFF: Shift solenoid valve SL not operating	-
Torque Converter Temperature Raise History	Torque converter temperature raise history status/ ON or OFF	OFF	-

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

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(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Connect the TC and TE1	Connects and disconnects TC and TE1. (changes to the fluid temperature detection mode)	ON/OFF	[Vehicle Condition] • Ignition switch ON • Vehicle stopped
Activate the Solenoid (SLU)	Operates shift solenoid valve SLU	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SLT)*	Operates shift solenoid valve SLT to raise the line pressure.	ON/OFF **HINT:** ON: No action (normal operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid (SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	[Vehicle Condition] • Vehicle Stopped • Engine idling
Activate the Lock Up	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more
Activate the Solenoid (SL)	Operates shift solenoid valve SL	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
			gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less
Activate the Solenoid (SL1)	Operates shift solenoid valve SL1	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL2)	Operates shift solenoid valve SL2	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL3)	Operates shift solenoid valve SL3	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N
Activate the Solenoid (SL4)	Operates shift solenoid valve SL4	ON/OFF	[Vehicle Condition] • Ignition switch ON • Engine stopped • Shift lever in P or N

*: The "Activate the Solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

Note that the pressure readings for the Active Test and Hydraulic Test are different.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7I0TZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DEFINITION OF TERMS; 2016 MY Tacoma [08/2015 -]		

DEFINITION OF TERMS

TERM	DEFINITION
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and details).
Related DTCs	Group of diagnostic trouble codes that are output by the ECM based on the same malfunction detection logic.
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM stores a DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring if multiple sensors and components are used to detect the malfunction. While one sensor is being monitored, the next sensor or component will not be monitored.
Required sensor / Components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects a malfunction only once during a single driving cycle. "Continuous" means that the ECM detects a malfunction every time the enabling conditions are met.
Duration	The minimum time for which the ECM must detect a continuous deviation in the monitored value(s) in order to store a DTC. Timing begins after the "typical enabling conditions" are met.
Typical malfunction thresholds	Value beyond which the ECM will determine that there is a malfunction and store a DTC.
MIL operation	MIL illumination timing after a malfunction is detected. "Immediate" means that the ECM illuminates the MIL the instant the ECM determines that there is a malfunction. "2 driving cycles" means that the ECM illuminates the MIL if the same malfunction is detected again in the next driving cycle.
Component operating range	Normal operation range of sensors and solenoids under normal driving conditions. Use these ranges as a reference. They cannot be used to judge if a sensor or solenoid is defective or not.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W76131X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DIAGNOSIS SYSTEM; 2016 MY Tacoma [08/2015 -]		

DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) When troubleshooting OBD II (On-Board Diagnostics) vehicles, an OBD II scan tool (complying with SAE J1987) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle ECM (Engine Control Module) can be then read.

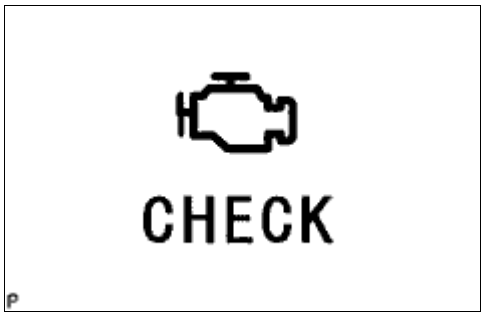
(b) OBD II regulations require that the vehicle on-board computer illuminate the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:

(1) The emission control system components.

(2) The powertrain control components (which affect vehicle emissions).

(3) The computer itself.

In addition, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



(c) To check for DTCs, connect the Techstream to the DLC3. The Techstream displays DTCs, freeze frame data, and a variety of the engine data. The DTCs and freeze frame data can be cleared with the Techstream. In order to enhance OBD function on vehicles and develop the off-board diagnosis system, Controller Area Network (CAN) communication is used in this system. CAN is a network which uses a pair of data transmission lines spanning multiple computers and sensors. It allows for high speed communications between the systems and simplification of the wire harness connections INFO .

2. NORMAL MODE AND CHECK MODE

(a) The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for duplicating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (the Techstream only).

3. 2 TRIP DETECTION LOGIC

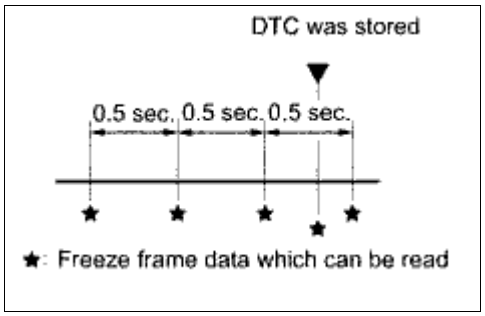
(a) When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the subsequent driving cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

(a) The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

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(b) The Techstream records freeze frame data in 5 different instances: 1) 3 times before the DTC is stored, 2) once when the DTC is stored, and 3) once after the DTC is stored. These sets of data can be used to simulate the vehicle condition around the time when the malfunction occurred. The data may help in finding the cause of the malfunction, or in judging if the DTC was caused by a temporary malfunction.



5. DLC3 (Data Link Connector 3)

(a) Check the DLC3 INFO .

6. BATTERY VOLTAGE

Standard Voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

7. MIL (Malfunction Indicator Lamp)

(a) The MIL illuminates when the turning the ignition switch to ON (the engine is not running).

(b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL does not illuminate when the turning the ignition switch to ON, check the MIL circuit INFO .

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Last Modified: 11-13-2015	6.6 S	**Doc ID:** RM000000W710QSX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DIAGNOSTIC TROUBLE CODE CHART; 2016 MY Tacoma [08/2015 -]		

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- If a DTC is displayed during the DTC check, check the parts listed in the table below and proceed to the "See page" given.
- *1: "Comes on" means the Malfunction Indicator Lamp (MIL) illuminates.
- *2: "DTC stored" means the ECM memorizes the trouble code if the ECM detects the DTC detection condition.
- These DTCs may be output when the clutches, brakes, gear components, etc., inside the automatic transmission are damaged.

Automatic Transmission System

DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P0705	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	Comes on	DTC stored	INFO
P0711	Transmission Fluid Temperature Sensor "A" Performance	Comes on	DTC stored	INFO
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input	Comes on	DTC stored	INFO
P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input	Comes on	DTC stored	INFO
P0717	Input Speed Sensor Circuit No Signal	Comes on	DTC stored	INFO
P0722	Output Speed Sensor Circuit No Signal	Comes on	DTC stored	INFO
P0741	Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL)	Comes on	DTC stored	INFO
P0746	Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1)	Comes on	DTC stored	INFO
P0748	Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)	Comes on	DTC stored	INFO
P0776	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)	Comes on	DTC stored	INFO
P0778	Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)	Comes on	DTC stored	INFO
P077C	Output Speed Sensor Circuit Low	Comes on	DTC stored	INFO
P077D	Output Speed Sensor Circuit High	Comes on	DTC stored	INFO

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DTC CODE	DETECTION ITEM	MIL*1	MEMORY*2	SEE PAGE
P0796	Pressure Control Solenoid "C" Performance (Shift Solenoid Valve SL3)	Comes on	DTC stored	INFO
P0798	Pressure Control Solenoid "C" Electrical (Shift Solenoid Valve SL3)	Comes on	DTC stored	INFO
P07BF	Input/Turbine Speed Sensor "A" Circuit Low	Comes on	DTC stored	INFO
P07C0	Input/Turbine Speed Sensor "A" Circuit High	Comes on	DTC stored	INFO
P2714	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)	Comes on	DTC stored	INFO
P2716	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)	Comes on	DTC stored	INFO
P2742	Transmission Fluid Temperature Sensor "B" Circuit Low Input	-	DTC stored	INFO
P2743	Transmission Fluid Temperature Sensor "B" Circuit High Input	-	DTC stored	INFO
P2757	Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU)	Comes on	DTC stored	INFO
P2759	Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU)	Comes on	DTC stored	INFO
P2769	Short in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)	Comes on	DTC stored	INFO
P2770	Open in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)	Comes on	DTC stored	INFO
P2773	Four Wheel Drive (4WD) Low Switch Circuit Low	Comes on	DTC stored	INFO
P2774	Four Wheel Drive (4WD) Low Switch Circuit High	Comes on	DTC stored	INFO
P2808	Pressure Control Solenoid "G" Performance (Shift Solenoid Valve SL4)	Comes on	DTC stored	INFO
P2810	Pressure Control Solenoid "G" Electrical (Shift Solenoid Valve SL4)	Comes on	DTC stored	INFO

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7712AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): DTC CHECK / CLEAR; 2016 MY Tacoma [08/2015 -]		

DTC CHECK / CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are cleared. Before changing modes, always check and make a note of DTCs and freeze frame data.

HINT:

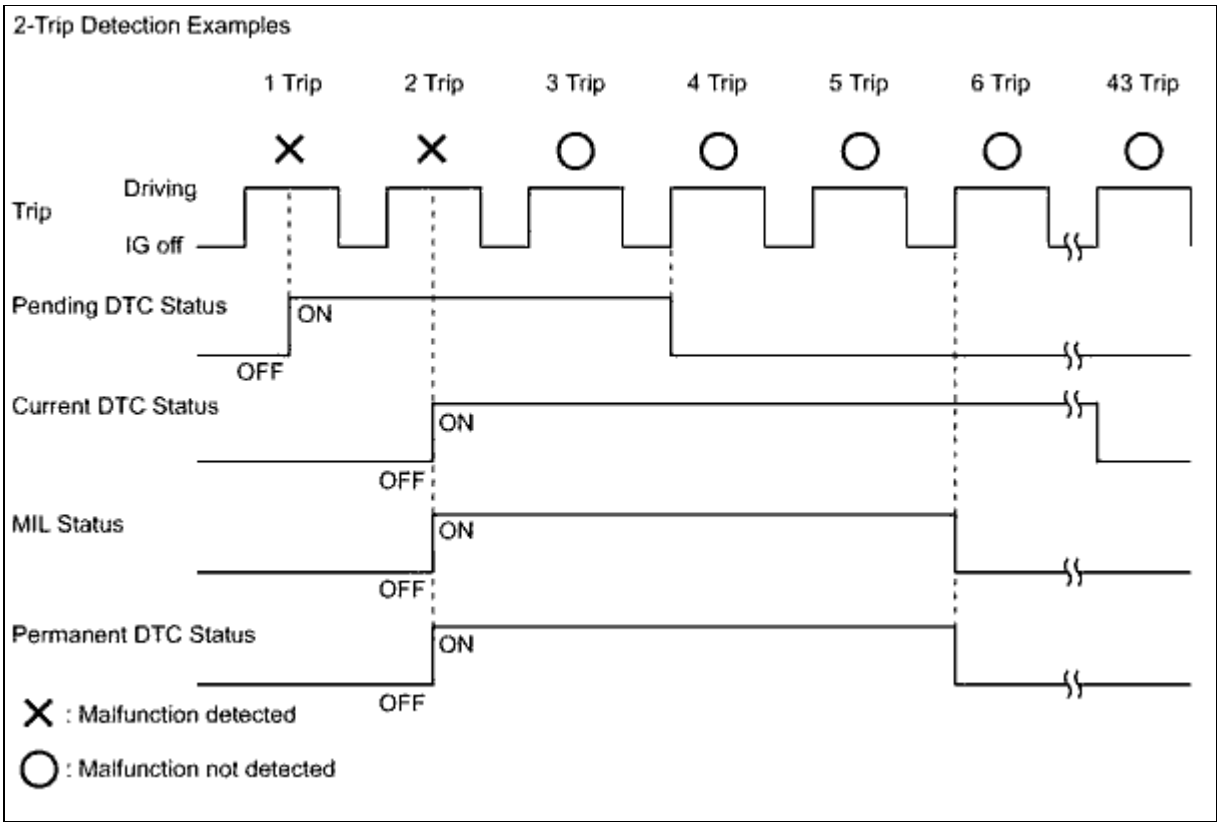
- DTCs which are stored in the ECM can be displayed on the Techstream. The Techstream can display current, pending and permanent DTCs.
- If a malfunction is detected during the current driving cycle, current and permanent DTCs are stored.
- Some DTCs are not stored if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- Current and pending DTCs can be cleared by using the Techstream or by disconnecting the cable from the negative battery terminal. However, permanent DTCs cannot be cleared using either of these two methods.
- After clearing current DTCs using the Techstream (or by disconnecting the cable from the negative battery terminal), permanent DTCs can be cleared when the system is determined to be normal for the relevant DTCs and then the universal trip is performed.

2 Trip Detection Examples

Pending DTC	Store condition	Malfunction detected
	Clear condition	System determined to be normal or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Current DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	No malfunctions in 40 driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Permanent DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	Ignition switch to ON after no malfunction is detected in 3 consecutive driving cycles or After DTCs cleared using Techstream or cable disconnected from negative battery terminal, malfunction not detected when universal trip driving performed
MIL	ON	Malfunction detected (2nd trip)

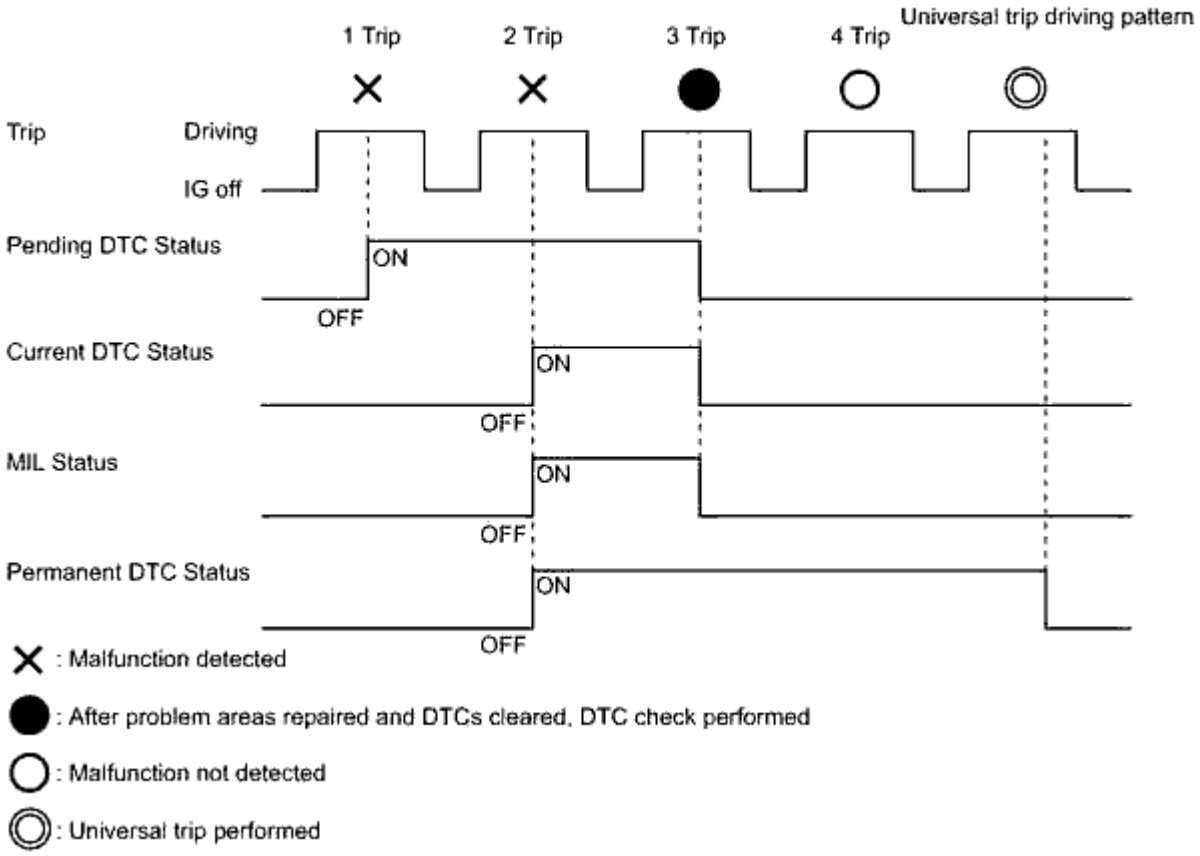
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	OFF	Ignition switch to ON after no malfunction is detected in 3 consecutive driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal



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2-Trip Detection Examples (Instance when DTCs were cleared midway through by using the Techstream or by disconnecting the cable from the negative battery terminal)



1. CHECK DTC

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Check the DTC(s) and freeze frame data, and then write them down.

(f) Check the details of the DTC(s) INFO .

2. CLEAR DTC (Pending and Current DTC)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Clear the DTCs.

3. CLEAR PERMANENT DTC

HINT:

Even if the following procedure is not performed, permanent DTCs are cleared if no malfunction are detected during 3 consecutive driving cycles.

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

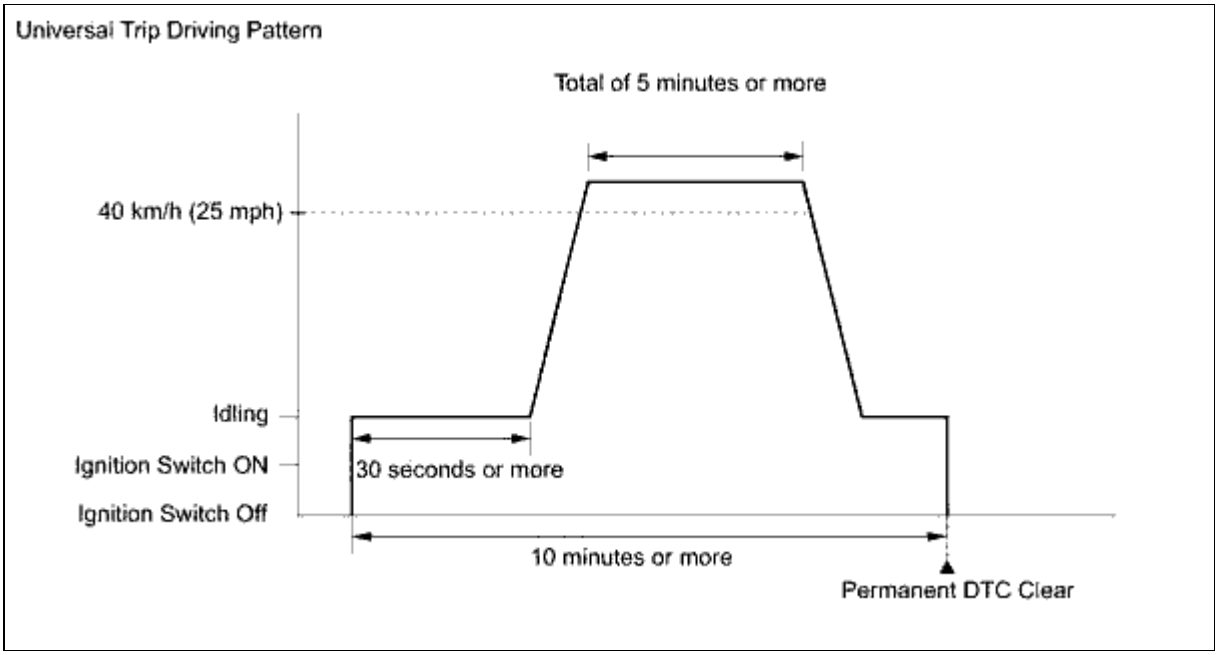
(e) Check if permanent DTCs are stored.

HINT:

If permanent DTCs are not output, it is not necessary to continue this procedure.

(f) Clear the DTCs.

(g) Perform the universal trip.



(1) Idle the engine for 30 seconds or more.

(2) Drive the vehicle at 40 km/h (25 mph) or more for a total of 5 minutes or more.

HINT:

- It is possible to complete the drive pattern even if the vehicle decelerates to less than 40 km/h (25 mph) during the driving cycle provided that the vehicle is driven at 40 km/h (25 mph) or more for a total of 5 minutes.
- When accelerating through the gears, make sure the vehicle is driven so all gears are used in order and no gears are skipped.

(3) Allow 10 minutes or more to elapse from the time the engine is started.

(h) Turn the ignition switch off.

(i) Wait 15 seconds.

(j) Turn the ignition switch to ON.

(k) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(l) Check that the permanent DTCs have been cleared.

HINT:

- If permanent DTCs have not been cleared, perform the universal trip again.
- Permanent DTCs are cleared when the universal trip is completed.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000O8L0TMX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): FAIL-SAFE CHART; 2016 MY Tacoma [08/2015 -]		

FAIL-SAFE CHART

1. Fail-safe

This function minimizes the loss of operation when any abnormality occurs in a sensor or solenoid.

Fail-safe Control List

MALFUNCTION PART	FUNCTION
Transmission revolution sensor (NT)	During a transmission revolution sensor (NT) malfunction, shift control is performed based on the transmission revolution sensor (SP2) signal.
Transmission revolution sensor (SP2)	During a transmission revolution sensor (SP2) malfunction, shift control is performed based on the wheel speed sensor signal.
ATF temperature sensors (No. 1 and No. 2)	During an ATF temperature sensor malfunction, up-shifting to 5th and 6th is prohibited.
Shift solenoid valve SL1, SL2, SL3 and SL4	Stop the conduction of electric power to a failed solenoid and shift gears by turning on/off normal solenoids. If all solenoids are malfunctioning, gears will be selected through mechanical hydraulic circuits.
Shift solenoid valve SLT	During a shift solenoid valve SLT malfunction, the current to the shift solenoid valve is stopped. However, shifting is performed through normal clutch pressure control.
Shift solenoid valve SLU	During a shift solenoid valve SLU malfunction, the current to the shift solenoid valve is stopped. This stops lock-up control, thus decreasing fuel economy.

Shift Solenoid Valve Operation when Normal

GEAR POSITION	1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

Fail-safe Control Chart

GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL1	ON Malfunction (without Fail-safe Control)*	1st	2nd	3rd	4th	4th	4th
	OFF Malfunction (without Fail-safe Control)	1st to N	2nd to N	3rd to N	4th to N	5th	6th
	Fail-safe Control during OFF Malfunction	Fixed in 3rd or 5th					

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GEAR POSITION UNDER NORMAL CONDITIONS		1ST	2ND	3RD	4TH	5TH	6TH
Shift solenoid valve SL2	ON Malfunction (without Fail-safe Control)*	1st to 4th	2nd to 4th	3rd to 4th	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd	4th to 1st	5th to N	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 2nd or 3rd					
Shift solenoid valve SL3	ON Malfunction (without Fail-safe Control)*	1st to 2nd	2nd	3rd	4th	5th	6th
	OFF Malfunction (without Fail-safe Control)	1st	2nd to 1st	3rd	4th	5th	6th to N
	Fail-safe Control during OFF Malfunction	Fixed in 3rd					
Shift solenoid valve SL4	ON Malfunction (without Fail-safe Control)*	3rd	3rd	3rd	4th	5th	5th
	OFF Malfunction (without Fail-safe Control)	1st	2nd	3rd to 1st	4th	5th to N	6th
	Fail-safe Control during OFF Malfunction	Fixed in 2nd					

*: Fail-safe control is not actuated when an ON malfunction occurs.

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W6Z17AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): HOW TO PROCEED WITH TROUBLESHOOTING; 2016 MY Tacoma [08/2015 -]		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The ECM of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN and multiplex communication system.
- *: Use the Techstream.

1.	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2.	**CUSTOMER PROBLEM ANALYSIS**

(a) Refer to the How to Troubleshoot ECU Controlled Systems in Introduction section INFO .

NEXT

3.	**INSPECT BATTERY VOLTAGE**

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

4.	**CONNECT TECHSTREAM TO DLC3***

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NEXT

5.	**CHECK AND CLEAR DTCS AND FREEZE FRAME DATA***

(a) Refer to DTC Check/Clear INFO .

NEXT

6.	**VISUAL INSPECTION**

NEXT

7.	**SELECT CHECK MODE DIAGNOSIS***

(a) Refer to Check Mode Procedure INFO .

NEXT

8.	**PROBLEM SYMPTOM CONFIRMATION**

(a) Refer to Road Test INFO .

Result

RESULT	PROCEED TO
Symptom does not occur	A
Symptom occurs	B

B **GO TO STEP 10**

A

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9.	**SYMPTOM SIMULATION**

(a) Refer to Symptom Simulation INFO .

NEXT

10.	**DTC CHECK***

(a) Refer to DTC Check/Clear INFO .

Result

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

B **GO TO STEP 18**

A

11.	**BASIC INSPECTION**

(a) Refer to Park/Neutral Position Switch INFO .

(b) Refer to Shift Lever Assembly INFO .

NG **GO TO STEP 21**

OK

12.	**MECHANICAL SYSTEM TESTS**

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(a) Refer to Mechanical System Tests INFO .

NG ▶ **GO TO STEP 17**

OK ▼

13.	**HYDRAULIC TEST**

(a) Refer to Hydraulic Test INFO .

NG ▶ **GO TO STEP 17**

OK ▼

14.	**MANUAL SHIFTING TEST**

(a) Refer to Manual Shifting Test INFO .

NG ▶ **GO TO STEP 16**

OK ▼

15.	**PROBLEM SYMPTOMS TABLE CHAPTER 1**

(a) Refer to Problem Symptoms Table INFO .

NG ▶ **GO TO STEP 19**

OK ▼

16.	**PROBLEM SYMPTOMS TABLE CHAPTER 2**

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(a) Refer to Problem Symptoms Table INFO .

NEXT

17.	**COMPONENT INSPECTION**

NEXT **GO TO STEP 21**

18.	**DTC CHART**

(a) Refer to Diagnostic Trouble Code Chart INFO .

NEXT

19.	**CIRCUIT INSPECTION**

NEXT

20.	**IDENTIFICATION OF PROBLEM**

NEXT

21.	**REPAIR OR REPLACE**

NEXT

22.	**CONFIRMATION TEST**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7B0UCX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): HYDRAULIC TEST; 2016 MY Tacoma [08/2015 -]		

HYDRAULIC TEST

1. PERFORM HYDRAULIC TEST

(a) Measure the line pressure.

CAUTION:

The line pressure test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.
- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.
- When conducting stall test, do not continue for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(1) Warm up the ATF (Automatic Transmission Fluid).

(2) Turn the ignition switch off.

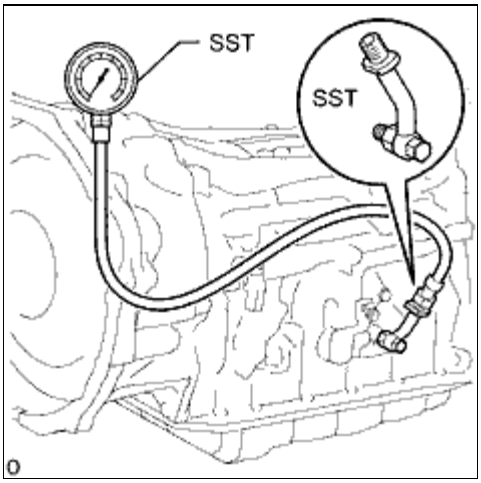
(3) Lift the vehicle up.

(4) Remove the test plug from the transmission case and connect SST.

SST: 09993-19015

09993-00010

09993-00040



(5) Lower the vehicle.

(6) Fully apply the parking brake and chock the 4 wheels.

(7) Start the engine and check the idling speed.

(8) Keep your left foot pressed firmly on the brake pedal and move the shift lever to D.

(9) Fully depress the accelerator pedal with your right foot. Quickly read the highest line pressure when the engine speed reaches the stall speed.

(10) In the same manner, perform the test with the shift lever in R.

Specified Line Pressure

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CONDITION	D POSITION	R POSITION
Stall speed	1450 to 1740 kPa (14.8 to 17.7 kgf/cm ^{2} , 210 to 252 psi)	1550 to 1840 kPa (15.8 to 18.8 kgf/cm ^{2} , 225 to 267 psi)

Evaluation

PROBLEM	POSSIBLE CAUSE
Measured values are higher than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective
Measured values are lower than the specified value in all positions	• Shift solenoid valve SLT defective • Regulator valve defective • Oil pump defective
Pressure is low in D position only	• D position circuit fluid leak • No. 1 clutch (C1) defective
Pressure is low in R position only	• R position circuit fluid leak • No. 2 brake (B2) defective • No. 3 brake (B3) defective

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7F0RTX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): INITIALIZATION; 2016 MY Tacoma [08/2015 -]		

INITIALIZATION

1. RESET MEMORY

NOTICE:

- Perform Reset Memory (AT initialization) when replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves.
- Reset Memory can be performed only with the Techstream.

HINT:

The ECM memorizes the vehicle conditions when the ECT controls the automatic transmission assembly and transmission valve body assembly. Therefore, when the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

The reset procedure is as follows.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Utility / Reset Memory.

NOTICE:

After performing Reset Memory, be sure to perform the Road Test INFO described earlier.

HINT:

The ECM learns through the Road Test.

2. ATF THERMAL DEGRADATION ESTIMATE RESET

NOTICE:

If either of the following conditions is met, perform ATF Thermal Degradation Estimate Reset.

- The ATF has been replaced.

  HINT:

  If 50000 or more is displayed for the Data List item "ATF Thermal Degradation Estimate", thermal degradation of the ATF is suspected. Perform ATF Thermal Degradation Estimate Reset after replacing the ATF.

- Approximately 50% or more of the ATF has been replaced during a repair of the transmission or a similar operation.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

NOTICE:

Do not start the engine.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Utility / ATF Thermal Degradation Estimate

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Reset.

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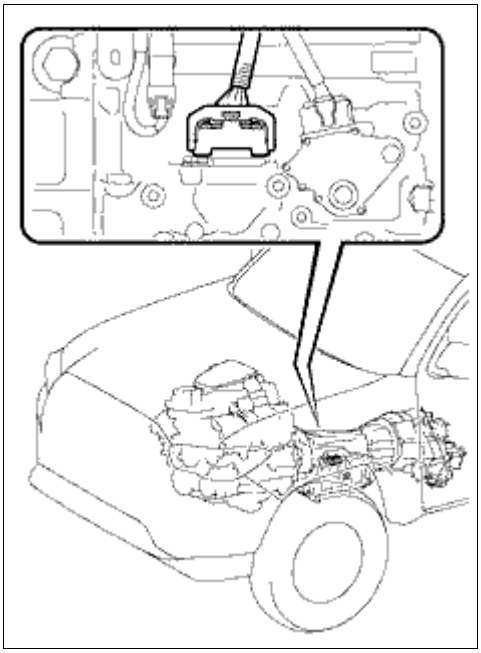
Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7C10DX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): MANUAL SHIFTING TEST; 2016 MY Tacoma [08/2015 -]		

MANUAL SHIFTING TEST

1. PERFORM MANUAL SHIFTING TEST

HINT:

- Using this test, it can be determined whether a problem is in an electrical circuit or if it is a mechanical problem in the transmission.
- If any abnormalities are found in the following test, the problem is in the transmission itself.



(a) Disconnect the connector of the transmission wire.

HINT:

It is possible to deactivate the electrical shift control by disconnecting the transmission wire. The gears can then be changed mechanically with the shift lever.

(b) Drive the vehicle with the transmission wire disconnected. Move the shift lever to each position to check whether the gear changes as shown in the table below.

SHIFT LEVER POSITION	GEAR
P	P
R	R
D	3rd

(c) Connect the connector of the transmission wire.

(d) Clear the DTCs INFO .

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7A0VPX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): MECHANICAL SYSTEM TESTS; 2016 MY Tacoma [08/2015 -]		

MECHANICAL SYSTEM TESTS

1. STALL SPEED TEST

HINT:

This test is to check the overall performance of the engine and transmission.

CAUTION:

- This test should be done on a paved surface (a surface that is not slippery).
- To ensure safety, perform this test in an open and level area that provides good traction.
- The stall speed test should always be performed with at least 2 people. One person should observe the condition of the wheels and wheel chocks while the other is performing the test.

NOTICE:

- Do not perform the stall speed test for more than 5 seconds.
- When performing the stall speed test more than once, make sure to wait 15 seconds or more between tests.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Chock all 4 wheels.

(h) Set the parking brake and keep the brake pedal depressed firmly with your left foot.

(i) Move the shift lever to D.

(j) Depress the accelerator pedal as much as possible with your right foot.

(k) Read the engine speed (stall speed) and release the accelerator pedal immediately.

Standard value:

STALL SPEED	
1990 rpm	+ 200 rpm
	- 200 rpm

Evaluation

TEST RESULT	POSSIBLE CAUSE
Stall speed is lower than standard value	• Engine power output may be insufficient • Stator one-way clutch is not operating properly • Torque converter assembly is faulty (stall speed is less than standard value by 600 rpm or more)

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TEST RESULT	POSSIBLE CAUSE
Stall speed is higher than standard value	• Line pressure is too low • No. 1 clutch (C1) is slipping • No. 3 one-way clutch (F3) is not operating properly • Improper fluid level

2. SHIFT TIME LAG TEST

HINT:

When the shift lever is moved while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the clutch, and brake.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) Run the vehicle until the transmission fluid temperature is between 50 and 80°C (122 and 176°F).

(f) Allow the engine to idle with the air conditioning off.

(g) Set the parking brake and keep the brake pedal depressed firmly.

(h) Check the D position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to D and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

(i) Check the R position time lag.

(1) Move the shift lever to N and wait for 1 minute.

(2) Move the shift lever to R and measure the time until the shock is felt.

(3) Repeat the 2 steps above 3 times, and calculate the average time of the 3 tests.

Standard value:
D position time lag is less than 1.2 seconds
R position time lag is less than 1.5 seconds

Evaluation

TEST RESULT	POSSIBLE CAUSE
D position time lag exceeds standard value	• Line pressure is too low • No. 1 clutch (C1) is worn • No. 3 one-way clutch (F3) is not operating properly
R position time lag exceeds standard value	• Line pressure is too low • No. 2 brake (B2) is worn • No. 3 brake (B3) is worn

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W7K0VJX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): MONITOR DRIVE PATTERN; 2016 MY Tacoma [08/2015 -]		

MONITOR DRIVE PATTERN

1. TEST MONITOR DRIVE PATTERN FOR ECT

CAUTION:

Perform this drive pattern on a level surface and strictly observe the posted speed limits and traffic laws while driving.

HINT:

Performing this drive pattern is one method to simulate the ECM (ECT) malfunction detection conditions.

Some DTCs may not be detected through ordinary, everyday driving. Also, DTCs may not be detected through this drive pattern.

(a) Preparation for driving

(1) Warm up the engine sufficiently (engine coolant temperature is 60°C (140°F) or higher).

(2) Drive the vehicle when the atmospheric temperature is -10°C (14°F) or higher.

Some malfunctions are not detected when the atmospheric temperature is below -10°C (14°F).

(b) Drive pattern

(1) Drive the vehicle through all the gears.

Stop → 1st → 2nd → 3rd → 4th → 5th → 6th → 6th (lock-up ON).

(2) Perform an engine brake test with the shift lever in S. While driving in the S6 range and 6th gear lock-up, move the shift lever to "-" and down-shift from 6th → 5th, 5th → 4th, 4th → 3rd, 3rd → 2nd and 2nd → 1st.

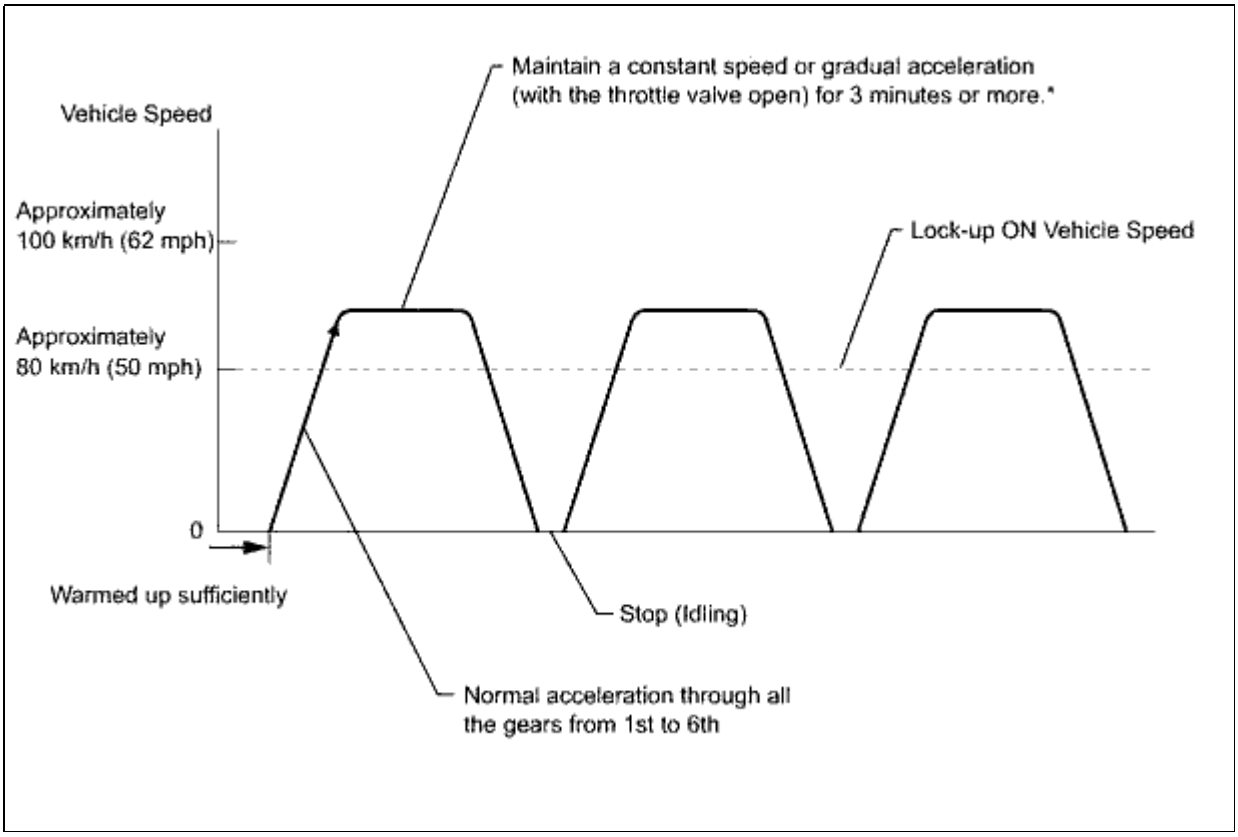
Check that engine braking is normal for every down-shift.

(3) Repeat the above drive pattern three times or more.

NOTICE:

- When using the Techstream, the monitor status can be checked in the Data List INFO .
- In the event that the drive pattern must be interrupted (due to traffic conditions or other factors), the drive pattern can be resumed and, in most cases, the monitor can be completed.

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HINT:

*: Drive the vehicle at a speed in top gear that will cause lock-up to engage. The vehicle can be driven at a speed lower than that in the above diagram under the lock-up condition.

NOTICE:

It is necessary to drive the vehicle for approximately 30 minutes to detect DTC P0711 (No. 1 ATF temperature sensor malfunction).

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8417GX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0705; Transmission Range Sensor Circuit Malfunction (PRNDL Input); 2016 MY Tacoma [08/2015 -]		

DTC	**P0705**	**Transmission Range Sensor Circuit Malfunction (PRNDL Input)**

DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0705	One of the following conditions is met: (A) Any 2 or more of the following signals are ON simultaneously (2 trip detection logic): • One of the following conditions is met. ○ P input signal is ON ○ N input signal is ON ○ NSW input signal is ON • R input signal • D input signal (B) Any of the following signals is ON for 2.0 seconds or more with the shift lever in S (2 trip detection logic): • P input signal • N input signal • NSW input signal • R input signal (C) All signals are OFF simultaneously for NSW, P, R, N and D (2 trip detection logic).	• Open or short in park/neutral position switch circuit • Transmission control switch (transmission floor shift assembly) • Park/neutral position switch • ECM

MONITOR DESCRIPTION

This DTC indicates a problem with the park/neutral position switch and the wire harness in the park/neutral position switch circuit.

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

For safety, the park/neutral position switch detects the shift lever position so that the engine can be started only when the shift lever is in P or N.

The park/neutral position switch sends a signal to the ECM according to the shift lever position (P, R, N, D or S). The ECM determines that there is a problem with the switch or related parts if it receives more than 1 position signal simultaneously. The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

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Related DTCs	P0705: Park/neutral position switch/Verify switch input
Required sensors/Components	Park/neutral position switch
Frequency of operation	Continuous
Duration	Condition (A) and (B) 2 sec. Condition (C) 60 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not stored	None
Ignition switch	ON
Battery voltage	10.5 V or more
Starter	off

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A)

Any two of the following conditions are met:	Conditions 1, 2 and 3
1. One of the following conditions is met:	Conditions (a), (b) or (c)
(a). P position switch	ON
(b). Park/neutral position switch (NSW)	ON
(c). N position switch	ON
2. R position switch	ON
3. D position switch	ON

Condition (B)

With the shift lever is S, one of the following conditions is met

P position switch	ON
N position switch	ON
Park/neutral position switch (NSW)	ON
R position switch	ON

Condition (C)

All of the following conditions are met

P position switch	OFF

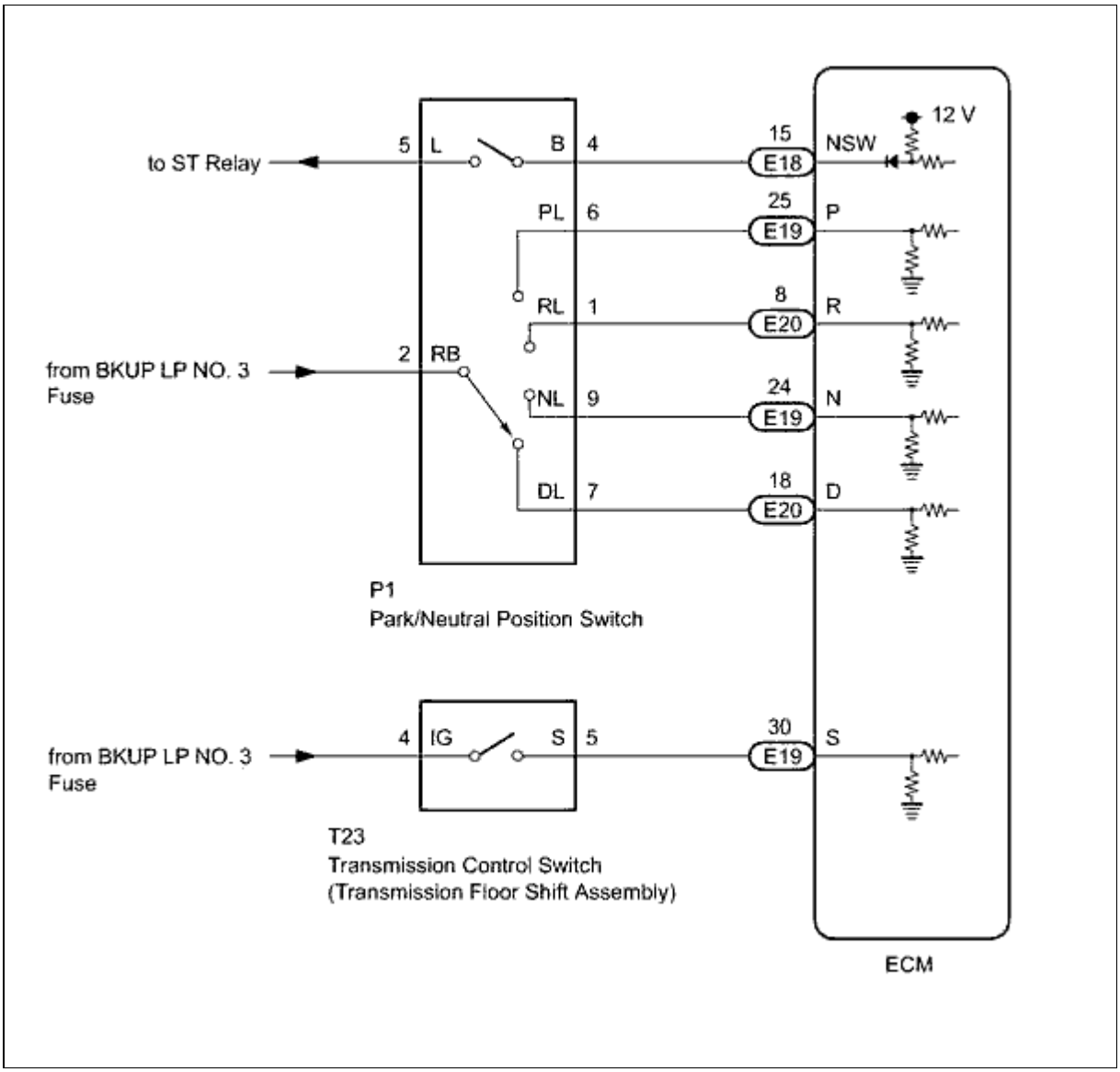
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N position switch	OFF
Park/neutral position switch (NSW)	OFF
R position switch	OFF
D position switch	OFF

COMPONENT OPERATING RANGE

Park/neutral position switch	The park/neutral position switch sends only one signal to the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

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- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the ignition switch to ON.*1
2. Wait with the shift lever in each position (P, R, N and D) for 60 seconds or more.*2
3. Wait for 2 seconds or more with the shift lever in S.*3
4. Turn the ignition switch off.
5. Perform steps (*1) through (*3) again.
6. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Neutral Position SW Signal	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P or N • OFF: Shift lever not in P or N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (P Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in P • OFF: Shift lever not in P	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Shift SW Status (R Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in R • OFF: Shift lever not in	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.

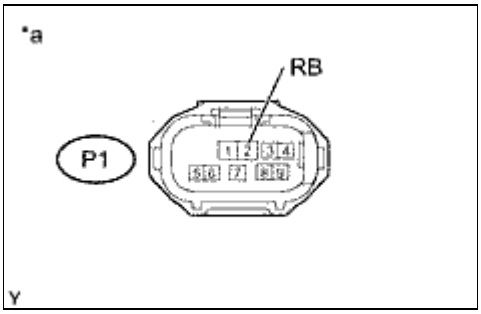
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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
		R	
Shift SW Status (N Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in N • OFF: Shift lever not in N	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-
Shift SW Status (D Range)	Park/neutral position switch status/ ON or OFF	• ON: Shift lever in D, S, "+" or "-" • OFF: Shift lever not in D, S, "+" or "-"	When the shift lever position displayed on the Techstream differs from the actual position, adjustment of the park/neutral position switch or the shift cable may be incorrect.

PROCEDURE

1.	**CHECK HARNESS AND CONNECTOR (BATTERY - PARK/NEUTRAL POSITION SWITCH)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-2 (RB) - Body ground	Ignition switch ON	11 to 14 V
P1-2 (RB) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

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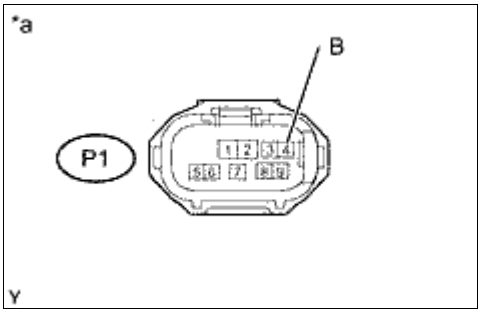
*a	Front view of wire harness connector (to Park/Neutral Position Switch)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK
▼

2.	**CHECK HARNESS AND CONNECTOR (NSW TERMINAL VOLTAGE)**

(a) Disconnect the park/neutral position switch connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
P1-4 (B) - Body ground	Ignition switch ON	11 to 14 V
P1-4 (B) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

*a	Front view of wire harness connector (to Park/Neutral Position Switch)

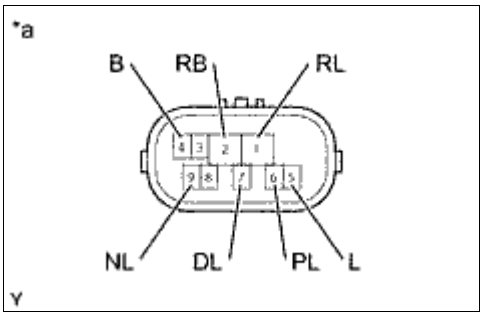
NG ▶ **GO TO STEP 7**

OK
▼

3.	**INSPECT PARK/NEUTRAL POSITION SWITCH**

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(a) Disconnect the P1 park/neutral position switch connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (B) - 5 (L)	Shift lever in P or N	Below 1 Ω
2 (RB) - 6 (PL)	Shift lever in P	Below 1 Ω
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
2 (RB) - 9 (NL)	Shift lever in N	Below 1 Ω
2 (RB) - 7 (DL)	Shift lever in D, S, "+" or "-"	Below 1 Ω
4 (B) - 5 (L)	Shift lever not in P or N	10 kΩ or higher
2 (RB) - 6 (PL)	Shift lever not in P	10 kΩ or higher
2 (RB) - 1 (RL)	Shift lever not in R	10 kΩ or higher
2 (RB) - 9 (NL)	Shift lever not in N	10 kΩ or higher
2 (RB) - 7 (DL)	Shift lever not in D, S, "+" or "-"	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Park/Neutral Position Switch)

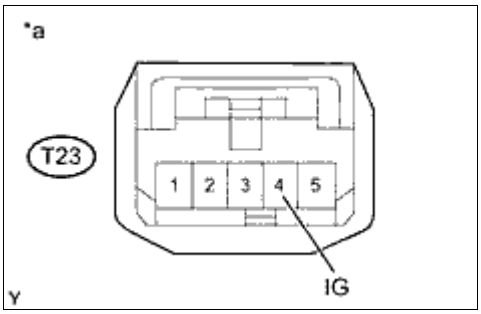
NG ▶ **REPLACE PARK/NEUTRAL POSITION SWITCH**

OK
▼

4.	**CHECK HARNESS AND CONNECTOR (BATTERY - TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY))**

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(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T23-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
T23-4 (IG) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

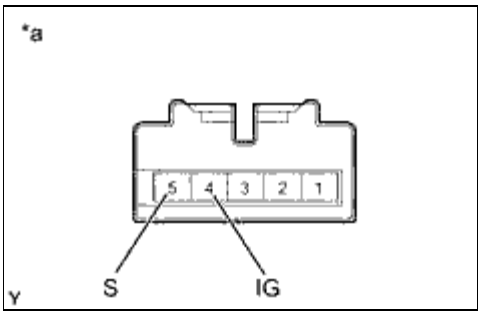
*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

5.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "-"	Below 1 Ω

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever not in S, "+" or "-"	10 kΩ or higher

Text in Illustration

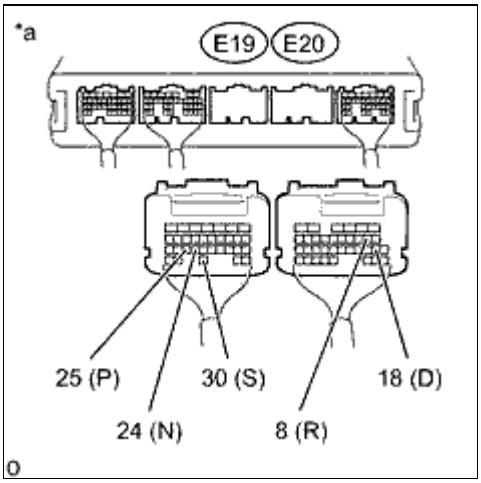
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

6.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH, TRANSMISSION CONTROL SWITCH - ECM)**

(a) Disconnect the ECM connectors.



(b) Turn the ignition switch to ON.

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-25 (P) - Body ground	• Ignition switch ON • Shift lever in P	11 to 14 V
E20-8 (R) - Body ground	• Ignition switch ON • Shift lever in R	11 to 14 V*

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-24 (N) - Body ground	• Ignition switch ON • Shift lever in N	11 to 14 V
E20-18 (D) - Body ground	• Ignition switch ON • Shift lever in D, S, "+" or "-"	11 to 14 V
E19-30 (S) - Body ground	• Ignition switch ON • Shift lever in S, "+" or "-"	11 to 14 V
E19-25 (P) - Body ground	• Ignition switch ON • Shift lever not in P	Below 1 V
E20-8 (R) - Body ground	• Ignition switch ON • Shift lever not in R	Below 1 V
E19-24 (N) - Body ground	• Ignition switch ON • Shift lever not in N	Below 1 V
E20-18 (D) - Body ground	• Ignition switch ON • Shift lever not in D, S, "+" or "-"	Below 1 V
E19-30 (S) - Body ground	• Ignition switch ON • Shift lever not in S, "+" or "-"	Below 1 V

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

HINT:

*: The voltage will drop slightly due to lighting up of the backup light.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

7.	**CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)**

(a) Disconnect the P1 park/neutral position switch connector.

(b) Disconnect the E18 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P1-4 (B) - E18-15 (NSW)	Always	Below 1 Ω
P1-4 (B) or E18-15 (NSW) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W7Z0SDX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0711; Transmission Fluid Temperature Sensor "A" Performance; 2016 MY Tacoma [08/2015 -]		

DTC	**P0711**	**Transmission Fluid Temperature Sensor "A" Performance**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0711	Either condition is met: (2 trip detection logic) • (a) Certain monitor enabling conditions are met and the No. 1 ATF temperature is below 20°C (68°F) • (b) Certain monitor enabling conditions are met and the No. 1 ATF temperature is 110°C (230°F) or higher	No. 1 ATF temperature sensor (transmission wire)

MONITOR DESCRIPTION

This DTC indicates that there is a problem with output signals from the No. 1 ATF temperature sensor and that the sensor itself is defective. The No. 1 ATF temperature sensor converts the ATF temperature into an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit or a fault of the No. 1 ATF temperature sensor.

After running the vehicle for a certain period, the ATF temperature should increase. If the ATF temperature is below 20°C (68°F) after running the vehicle for a certain period, the ECM interprets this as a malfunction, illuminates the MIL and stores the DTC.

When the ATF temperature is 110°C (230°F) or higher and the engine coolant temperature takes 10 seconds or more to reach 60°C (140°F) after a cold start, the ECM also determines this as a malfunction, illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0711: ATF temperature sensor/Rationality check
Required sensors/Components	ATF temperature sensor (TFT sensor)

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Frequency of operation	Continuous
Duration	Condition (A), (B), (C) and (D): 3 sec. Condition (E): Continuous
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0112, P0113 (IAT (Intake air temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system) P2610 (Soak timer circuit)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
IAT (Intake air temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Soak timer circuit	Not circuit malfunction

Condition (A):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	10 min. or more
Accumulated driving time*1	100 sec. or more
Driving distance after engine start*3	4.9 km (3.04 miles) or more
IAT*4	15°C (59°F) or higher
ECT (12 sec. after engine start)	15°C (59°F) or higher
Soak time	5 hours or more

Condition (B):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	39 min. or more
Accumulated driving time*1	231 sec. or more
Driving distance after engine start*3	16 km (9.9 miles) or more
IAT*4	-10°C (14°F) or higher
ECT (12 sec. after engine start)	-10°C (14°F) or higher

Condition (C):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	30 min. or more
Accumulated driving time*1	400 sec. or more
Driving distance after engine start*3	16 km (9.9 miles) or more
IAT*4	-15°C (5°F) or higher
ECT (12 sec. after engine start)	-15°C (5°F) or higher

Condition (D):

Duration time from engine start	12 sec. or more
ECT	-15°C (5°F) or higher
Time after engine start except for continuing shift position "N" or "P"*2	55 min. or more
Accumulated driving time*1	750 sec. or more
Driving distance after engine start*3	27 km (16.8 miles) or more

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Condition (E):

Time after ECT reaches 60°C (140°F)	10 sec. or more
ATF temperature (12 sec. after engine start)	110°C (230°F) or higher
ECT (12 sec. after engine start)	Below 35°C (95°F)

HINT:

*1: Following conditions are met

Engine speed - Turbine speed	50 rpm or more
Output speed	400 rpm or more
Throttle valve opening angle	5% or more
Shift position	Not "N" or "P"
Engine	Running
However, accumulated driving time is cleared	-
When following condition met	-
Duration time from shifting to "N" or "P"	300 sec. or more

*2: Time after engine start is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*3: Driving distance is cleared when following condition met

Duration time from shifting to "N" or "P"	300 sec. or more

*4: IAT is measured when either of following conditions met

12 sec. after engine start	-
Duration time from shifting to "N" or "P"	300 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

When either condition below is met: Condition (A), (B), (C) and (D) or (E)

Condition (A), (B), (C) and (D):

ATF temperature	Below 20°C (68°F)

Condition (E):

ATF temperature	110°C (230°F) or higher

COMPONENT OPERATING RANGE

ATF temperature	20°C (68°F) or higher, and Below 110°C (230°F)

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.*1
2. Drive the vehicle 27 km (16.8 miles) or more over a period of 12 minutes and 30 seconds or more.*2
3. After 55 minutes or more have elapsed since performing step (*1), turn the ignition switch off.*3
4. Perform steps (*1) through (*3) again.
5. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P0712 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P0713 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

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TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

If a circuit related to the No. 1 ATF temperature sensor becomes open, P0713 is immediately stored (in 0.5 seconds). When P0713 is stored, P0711 cannot be stored.

It is not necessary to inspect the circuit when P0711 is stored.

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0711)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0711 is output	A
P0711 and other DTCs are output	B

HINT:

If any other codes besides P0711 are output, perform troubleshooting for those DTCs first.

B ▶ **GO TO DTC CHART**

A ▼

2.	**CHECK TRANSMISSION FLUID LEVEL**

(a) Check the transmission fluid level INFO .

OK:

Automatic transmission fluid level is correct.

NG ▶ **ADJUST FLUID LEVEL**

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OK ▶ REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W850TTX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0712,P0713; Transmission Fluid Temperature Sensor "A" Circuit Low Input; 2016 MY Tacoma [08/2015 -]		

DTC	**P0712**	**Transmission Fluid Temperature Sensor "A" Circuit Low Input**

DTC	**P0713**	**Transmission Fluid Temperature Sensor "A" Circuit High Input**

DESCRIPTION

The No. 1 ATF temperature sensor converts the fluid temperature into a resistance value for use by the ECM.

The ECM applies a voltage to the temperature sensor through terminal THO1 of the ECM.

The sensor resistance changes with the ATF temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0712	The output voltage from the ATF temperature sensor is below 0.14 V for 0.5 sec. or more (1 trip detection logic).	• Short in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM
P0713	The output voltage from the ATF temperature sensor is higher than 4.91 V for 0.5 sec. or more, and either condition is met (1 trip detection logic): (A) 600 sec. or more have elapsed after the engine start when engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 sec. or more have elapsed after the engine start when engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open in No. 1 ATF temperature sensor circuit • No. 1 ATF temperature sensor (transmission wire) • ECM

MONITOR DESCRIPTION

The No. 1 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 1 ATF temperature sensor circuit. If the resistance value of the No. 1 ATF temperature sensor is below 79 Ω*1 or higher than 156 kΩ*2, the ECM interprets this as a fault in the No. 1 ATF temperature sensor or wiring. The ECM will illuminate the MIL and store the DTC.

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*1: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

*2: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

MONITOR STRATEGY

Related DTCs	P0712: ATF temperature sensor/Range check (Low voltage) P0713: ATF temperature sensor/Range check (High voltage)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

P0712:

The monitor will run whenever the following DTCs are not stored	None

P0713:

Either condition is met: Condition (A) or (B)

Condition (A):

The monitor will run whenever the following DTCs are not stored	P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit fail) P00AC, P00AD, P0112, P0113 (IAT (Intake air temperature) sensor circuit fail)
Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	-29.375°C (-20.875°F) or less
Time after engine start	600 sec. or more
ECT (Engine coolant temperature) sensor circuit fail (P0115, P0117, P0118)	Not detected
IAT (Intake air temperature) sensor circuit fail (P00AC, P00AD, P0112, P0113)	Not detected

Condition (B):

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The monitor will run whenever the following DTCs are not stored	P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit fail) P00AC, P00AD, P0112, P0113 (IAT (Intake air temperature) sensor circuit fail)
Engine coolant temperature (ECT) or intake air temperature (IAT) at engine start	Higher than -29.375°C (-20.875°F)
Time after engine start	10 sec. or more
ECT (Engine coolant temperature) sensor circuit fail (P0115, P0117, P0118)	Not detected
IAT (Intake air temperature) sensor circuit fail (P00AC, P00AD, P0112, P0113)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0712:

ATF temperature sensor voltage (ATF temperature)	Below 0.14 V (Higher than 164°C (327°F))

P0713:

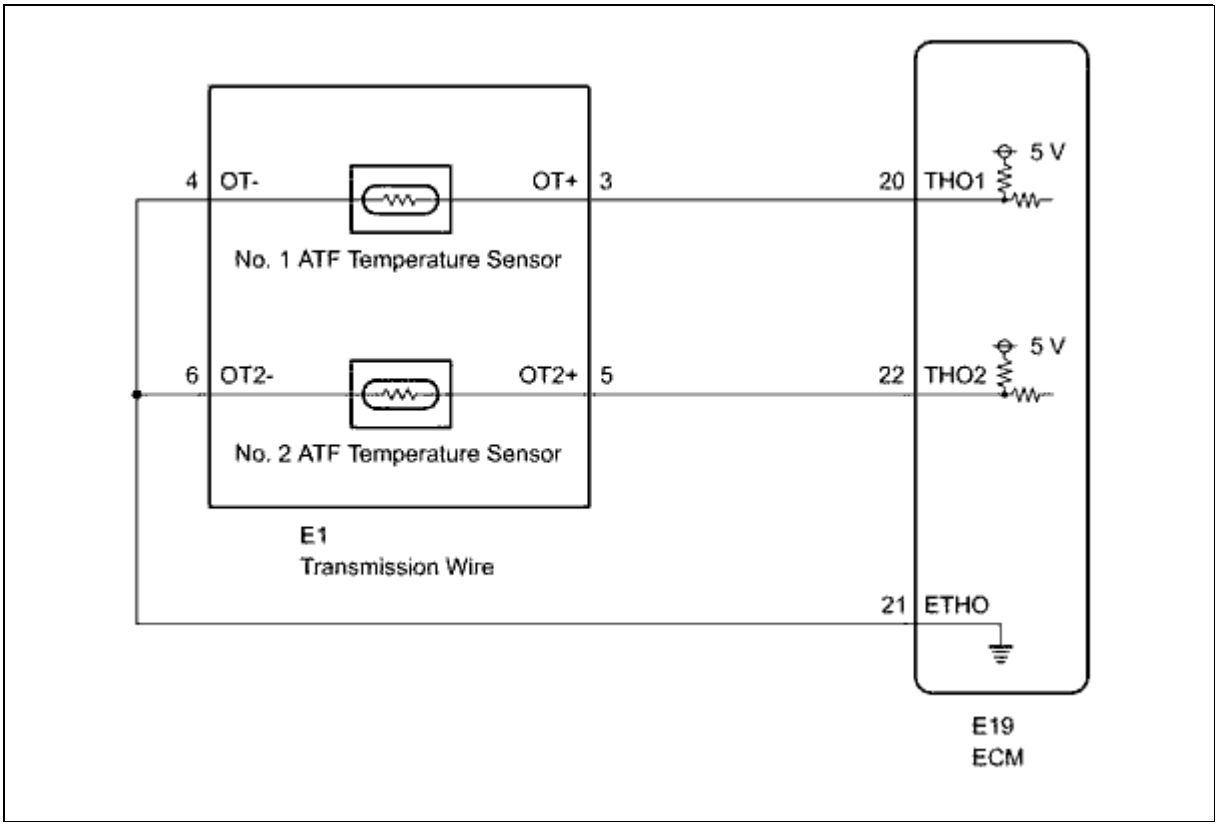
ATF temperature sensor voltage (ATF temperature)	Higher than 4.91 V (Below -48°C (-54°F))

COMPONENT OPERATING RANGE

ATF temperature sensor voltage (ATF temperature)	0.14 V or higher, and 4.91 V or less (-48°C (-54°F) or higher, and 164°C (327°F) or less)

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 10 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

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(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature 1	No. 1 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 1 ATF temperature sensor circuit is open or shorted.

HINT:

When DTC P0712 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.

When DTC P0713 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

Check the temperature displayed on the Techstream in order to check if a malfunction exists.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

HINT:

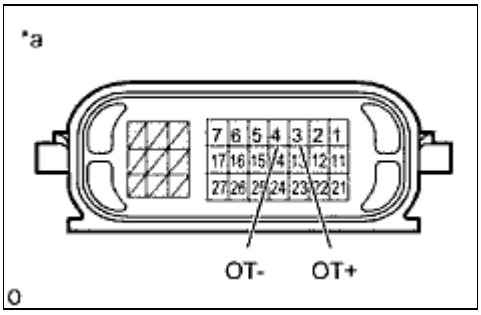
If the circuit related to the No. 1 ATF temperature sensor becomes open, P0713 is immediately stored (in 0.5 seconds). When P0713 is stored, P0711 cannot be stored.

It is not necessary to inspect the circuit when P0711 is stored.

PROCEDURE

1.	**INSPECT NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
3 (OT+) or 4 (OT-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

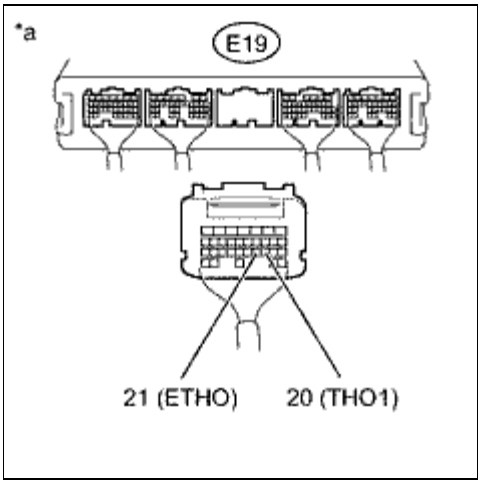
*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 1 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-20 (THO1) - E19-21 (ETHO)	Always	79 Ω to 156 kΩ
E19-20 (THO1) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000025K005HX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0717,P07BF,P07C0; Input Speed Sensor Circuit No Signal; 2016 MY Tacoma [08/2015 -]		

DTC	**P0717**	**Input Speed Sensor Circuit No Signal**

DTC	**P07BF**	**Input/Turbine Speed Sensor "A" Circuit Low**

DTC	**P07C0**	**Input/Turbine Speed Sensor "A" Circuit High**

DESCRIPTION

This sensor detects the rotation speed of the turbine which shows the input turbine speed of the transmission. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0717	All conditions are met for 5 seconds or more (1 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Gear position is 2nd, 3rd, 4th, 5th or 6th. (c) Transmission output shaft speed is 1000 rpm or more. (d) The vehicle speed is 25 km/h (15.54 mph) or more. (e) Transmission revolution sensor (NT) value is less than 300 rpm.	• Harness or connector • Transmission revolution sensor (NT) • ECM
P07BF	When the transmission revolution sensor (NT) input voltage is below 0.1 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM
P07C0	When the transmission revolution sensor (NT) input voltage is higher than 1.9 V for 4.5 seconds or more (1 trip detection logic).	• Harness or connector • Transmission revolution sensor (NT) • ECM

MONITOR DESCRIPTION

The transmission revolution sensor (NT) detects the transmission input shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

While the vehicle is operating in 2nd, 3rd, 4th, 5th or 6th gear with the shift lever in D, if the input shaft speed is less than 300 rpm*1 and the output shaft speed is more than 1000 rpm*2, the ECM interprets this as a fault,

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illuminates the MIL and stores the DTC.

*1: Pulse is not output or is irregularly output.

*2: The vehicle speed is 25 km/h (15.54 mph) or more.

MONITOR STRATEGY

Related DTCs	P0717: Transmission revolution sensor (NT)/Verify pulse input P07BF: Transmission revolution sensor (NT)/Range check (Low voltage) P07C0: Transmission revolution sensor (NT)/Range check (High voltage)
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P0717: 5 sec. P07BF and P07C0: 4.5 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

P0717:

The monitor will run whenever the following DTCs are not stored	P0746, P0748 (Shift solenoid valve SL1 circuit) P0776, P0778 (Shift solenoid valve SL2 circuit) P0796, P0798 (Shift solenoid valve SL3 circuit) P2808, P2810 (Shift solenoid valve SL4 circuit)
Park/neutral position switch (NSW)	OFF
Shift change	Shift change is completed before starting next shift change operation
ECM selected gear	Not 1st
Output shaft revolution	1000 rpm or more
R position switch	OFF
Engine	Running
Vehicle speed	25 km/h (15.54 mph) or more
Transmission range switch circuit fail (P0705)	Not detected
Turbine speed sensor range check fail (P07BF, P07C0)	Not detected

P07BF and P07C0:

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The monitor will run whenever the following DTCs are not stored	None
Turbine speed sensor pulse input fail (P0717)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0717:

Turbine speed sensor revolution	Less than 300 rpm

P07BF:

Turbine speed sensor voltage	Below 0.1 V

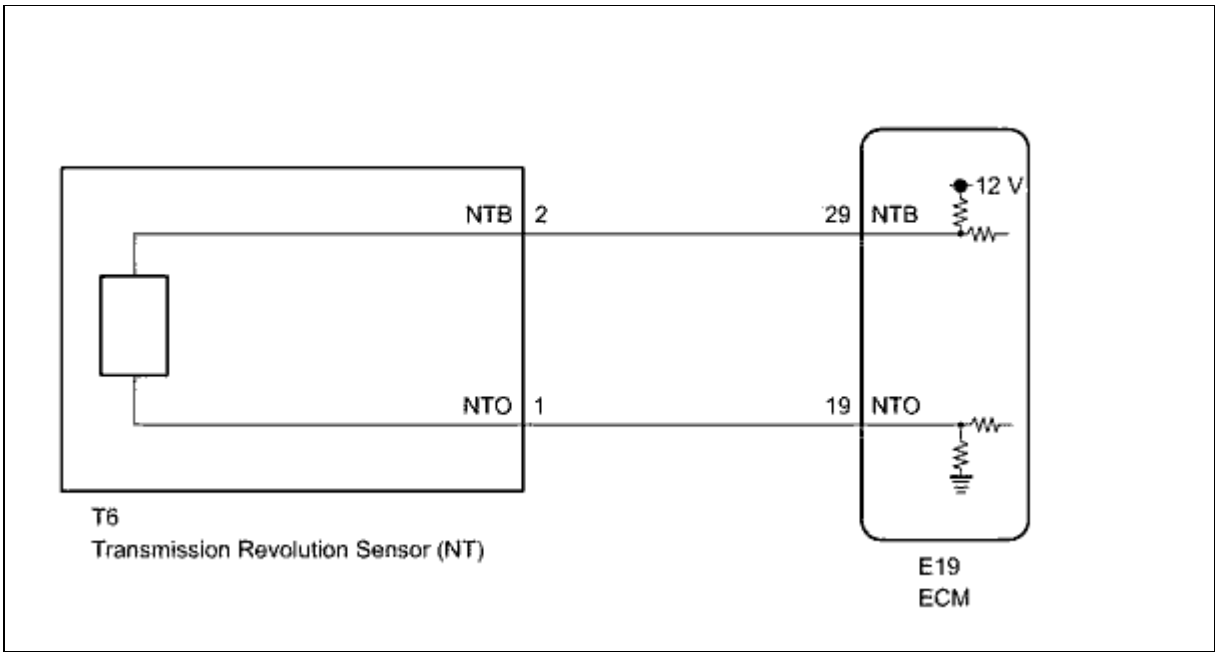
P07C0:

Turbine speed sensor voltage	Higher than 1.9 V

COMPONENT OPERATING RANGE

Transmission revolution sensor (NT)	Turbine speed is equal to engine speed with lock-up ON

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

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After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test and drive the vehicle for 5 seconds or more at 25 km/h (15.54 mph) or more INFO .
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (NT)	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm

HINT:

- SPD (NT) is always 0 while driving: Open or short in the sensor or circuit.
- SPD (NT) is always more than 0 and less than 300 rpm while driving the vehicle at 25 km/h (15.54 mph) or more: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPD (NT) AND NT SENSOR VOLTAGE)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

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(d) Enter the following menus: Powertrain / Engine and ECT / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (NT)	Input shaft speed/ Min.: 0 rpm Max.: 12750 rpm	• Lock-up on (after warming up the engine): Value from transmission revolution sensor (NT) equal to engine speed • Lock-up off (idling with shift lever in N): Value from transmission revolution sensor (NT) nearly equal to engine speed	Data is displayed in increments of 50 rpm
NT Sensor Voltage	Transmission revolution sensor (NT) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

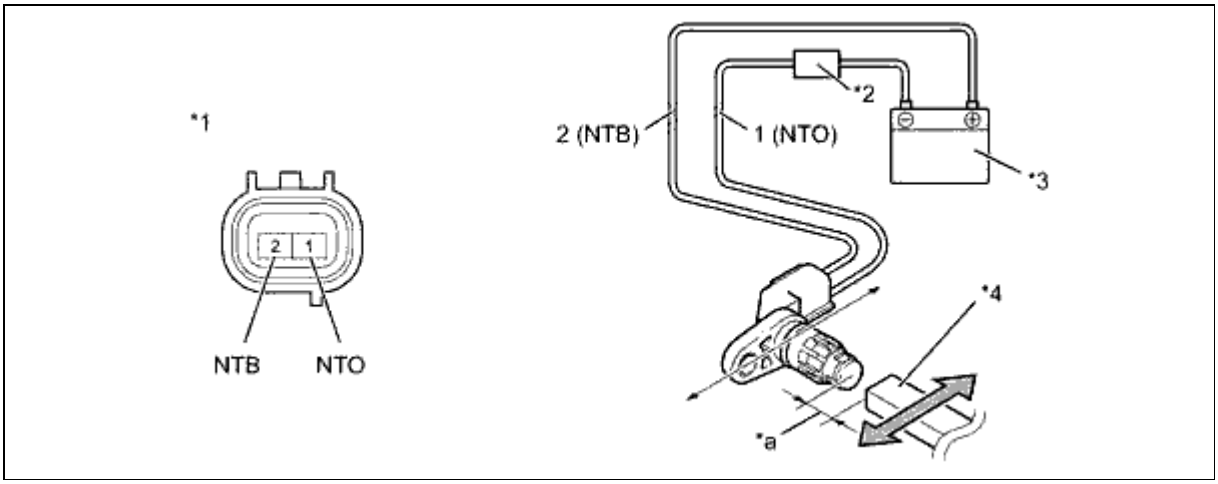
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (NT)**

(a) Remove the transmission revolution sensor (NT) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (NT)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (NT) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (NTO) - 2 (NTB)	Low signal	4 to 8 mA
1 (NTO) - 2 (NTB)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (NT)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (NT) - ECM)**

(a) Disconnect the T6 transmission revolution sensor (NT) connector.

(b) Disconnect the E19 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T6-2 (NTB) - E19-29 (NTB)	Always	Below 1 Ω
T6-1 (NTO) - E19-19 (NTO)	Always	Below 1 Ω
T6-2 (NTB) - Body ground	Always	10 kΩ or higher
T6-1 (NTO) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000003UR201WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0722,P077C,P077D; Output Speed Sensor Circuit No Signal; 2016 MY Tacoma [08/2015 -]		

DTC	**P0722**	**Output Speed Sensor Circuit No Signal**

DTC	**P077C**	**Output Speed Sensor Circuit Low**

DTC	**P077D**	**Output Speed Sensor Circuit High**

DESCRIPTION

This sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. By comparing the input turbine speed signal (NT) with the output shaft speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. As a result, the gears shift smoothly.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
P0722	All conditions are met for 5 seconds or more (2 trip detection logic): (a) Park/neutral position switch D input signal is ON. (b) Either condition is met. • Gear position is 1st: Transmission revolution sensor (NT) value is 1310 rpm or more. • Gear position is 2nd, 3rd, 4th, 5th or 6th: Transmission revolution sensor (NT) value is 760 rpm or more. (c) The vehicle speed is 8.99 km/h (5.59 mph) or more. (d) No signal from transmission revolution sensor (SP2) is input to the ECM.	• Harness or connector • Transmission revolution sensor (SP2) • ECM
P077C	When the transmission revolution sensor (SP2) input voltage is below 0.1 V for 4.5 seconds or more (2 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2) • ECM
P077D	When the transmission revolution sensor (SP2) input voltage is higher than 1.9 V for 4.5 seconds or more (2 trip detection logic).	• Harness or connector • Transmission revolution sensor (SP2)

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DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
		• ECM

MONITOR DESCRIPTION

The transmission revolution sensor (SP2) detects the transmission output shaft speed. The ECM calculates gear shifts comparing the transmission revolution sensor (NT) with the transmission revolution sensor (SP2).

If the ECM detects no signal from the transmission revolution sensor (SP2) even while the vehicle is moving, it will conclude that there is a malfunction in the transmission revolution sensor (SP2). The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0722: Transmission revolution sensor (SP2)/Verify pulse input P077C: Transmission revolution sensor (SP2)/Range check (Low voltage) P077D: Transmission revolution sensor (SP2)/Range check (High voltage)
Required sensors/Components	Transmission revolution sensor (NT), Transmission revolution sensor (SP2)
Frequency of operation	Continuous
Duration	P0722: 5 sec. P077C, P077D: 4.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF

P0722:

Vehicle speed	8.99 km/h (5.59 mph) or more
Shift change	Shift change is completed before starting next shift change operation
R position switch	OFF
Park/neutral position switch (NSW)	OFF
Engine	Running
Transmission range switch circuit fail (P0705)	Not detected

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Output speed sensor range check fail (P077C, P077D)	Not detected
Either of the following conditions is met	Conditions 1 or 2
1. All of the following conditions are met	-
ECM selected gear	1st
Turbine speed sensor revolution	1310 rpm or more
2. All of the following conditions are met	-
ECM selected gear	Not 1st
Turbine speed sensor revolution	760 rpm or more

P077C and P077D:

Output speed sensor pulse input fail (P0722)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0722:

Output speed sensor signal	No signal

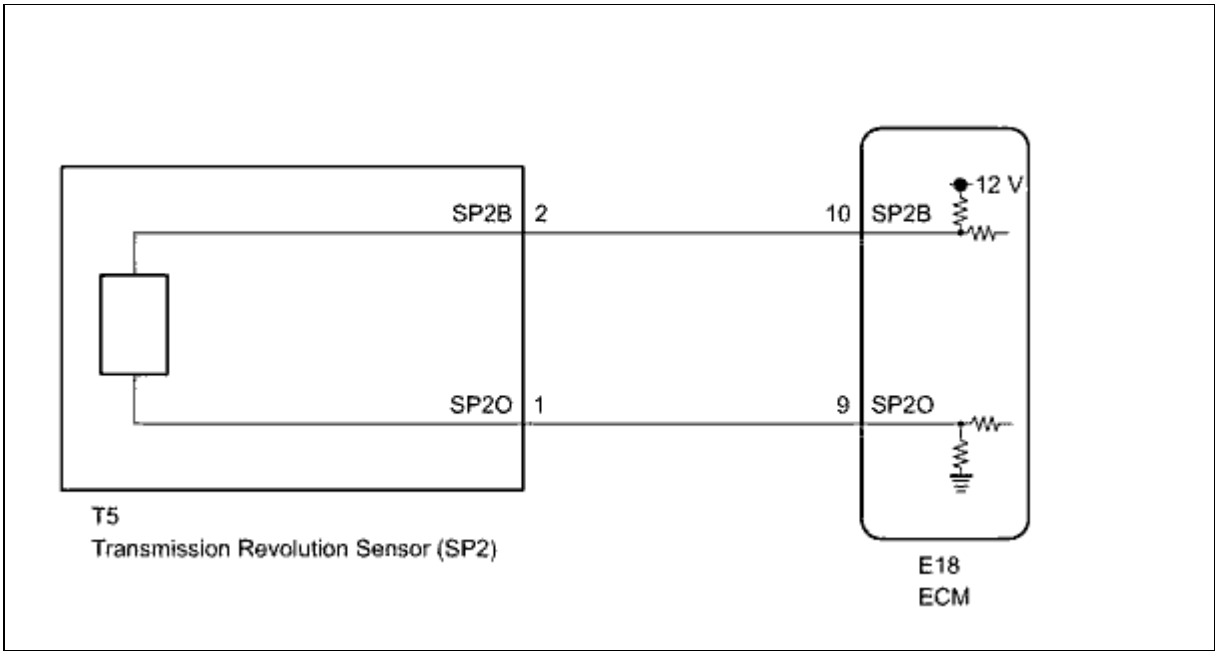
P077C:

Output speed	Below 0.1 V

P077D:

Output speed	Higher than 1.9 V

WIRING DIAGRAM



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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-

HINT:

- SPD (SP2) is always 0 while driving: Open or short in the sensor or circuit.
- SPD (SP2) value displayed on the Techstream is much lower than the actual vehicle speed: Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPD (SP2) AND SP2 SENSOR VOLTAGE)**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	0 km/h (0 mph): Vehicle stopped (equal to vehicle speed)	-
SP2 Sensor Voltage	Transmission revolution sensor (SP2) output voltage/ Min.: 0.000 V Max.: 4.999 V	0.1 to 1.9 V: Engine idling	-

Result

RESULT	PROCEED TO
Data display is not within Normal Condition range	A
Data display is within Normal Condition range	B

B ▶ **REPLACE ECM**

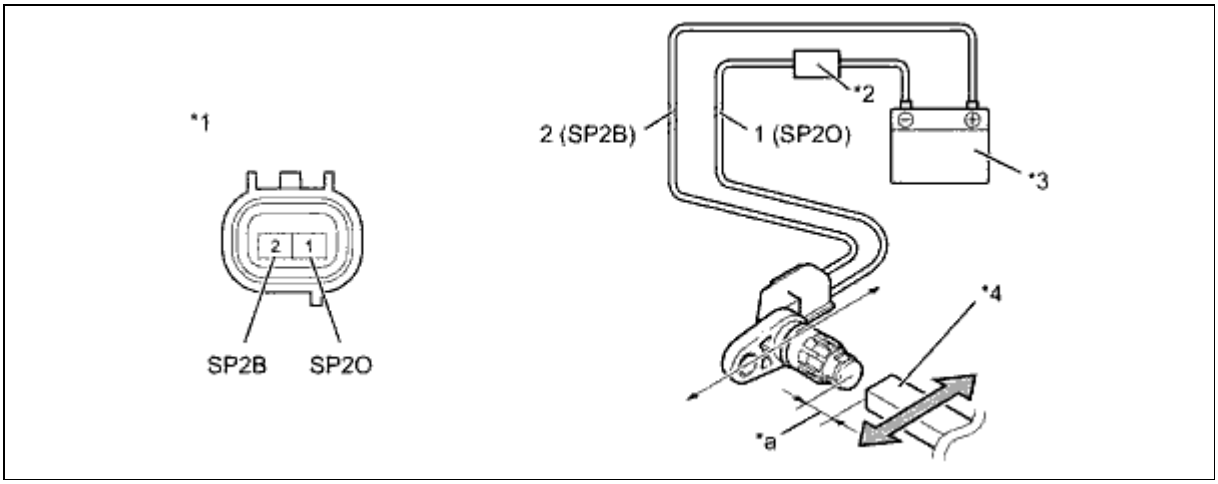
A ▼

2.	**INSPECT TRANSMISSION REVOLUTION SENSOR (SP2)**

(a) Remove the transmission revolution sensor (SP2) INFO .

(b) Connect the battery to the sensor as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (SP2)	*2	Ammeter
*3	Battery	*4	Magnet
*a	5 mm (0.197 in.) or less	-	-

(c) Wave a magnetic object left and right in front of the transmission revolution sensor (SP2) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(d) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SP2O) - 2 (SP2B)	Low signal	4 to 8 mA
1 (SP2O) - 2 (SP2B)	High signal	12 to 16 mA

NG ▶ **REPLACE TRANSMISSION REVOLUTION SENSOR (SP2)**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION REVOLUTION SENSOR (SP2) - ECM)**

(a) Disconnect the T5 transmission revolution sensor (SP2) connector.

(b) Disconnect the E18 ECM connector.

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(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T5-2 (SP2B) - E18-10 (SP2B)	Always	Below 1 Ω
T5-1 (SP2O) - E18-9 (SP2O)	Always	Below 1 Ω
T5-2 (SP2B) - Body ground	Always	10 kΩ or higher
T5-1 (SP2O) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000027R705RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0741; Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL); 2016 MY Tacoma [08/2015 -]		

DTC	**P0741**	**Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve SL)**

SYSTEM DESCRIPTION

The ECM uses signals from the throttle position sensor, mass air flow meter, transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor to help determine the engagement timing of the lock-up clutch. The ECM monitors the engagement of the clutch using the transmission revolution sensor (NT), transmission revolution sensor (SP2) and crankshaft position sensor.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SL, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0741	Lock-up does not occur when requested (2 trip detection logic).	• Shift solenoid valve SL remains closed • Transmission wire • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear etc.) • Line pressure is too low

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature, and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SL. When shift solenoid valve SL is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SL or lock-up system performance. The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)

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- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P0741: Shift solenoid valve SL OFF malfunction
Required sensors/Components	Shift solenoid valve SL, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE), Throttle position sensor (VPA1), Mass air flow meter (MAF), ATF temperature sensor (THO1), Engine coolant temperature sensor (ECT)
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction

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Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

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OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

| Engine Speed - Turbine speed |	70 rpm or more

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation.

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
			[Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more

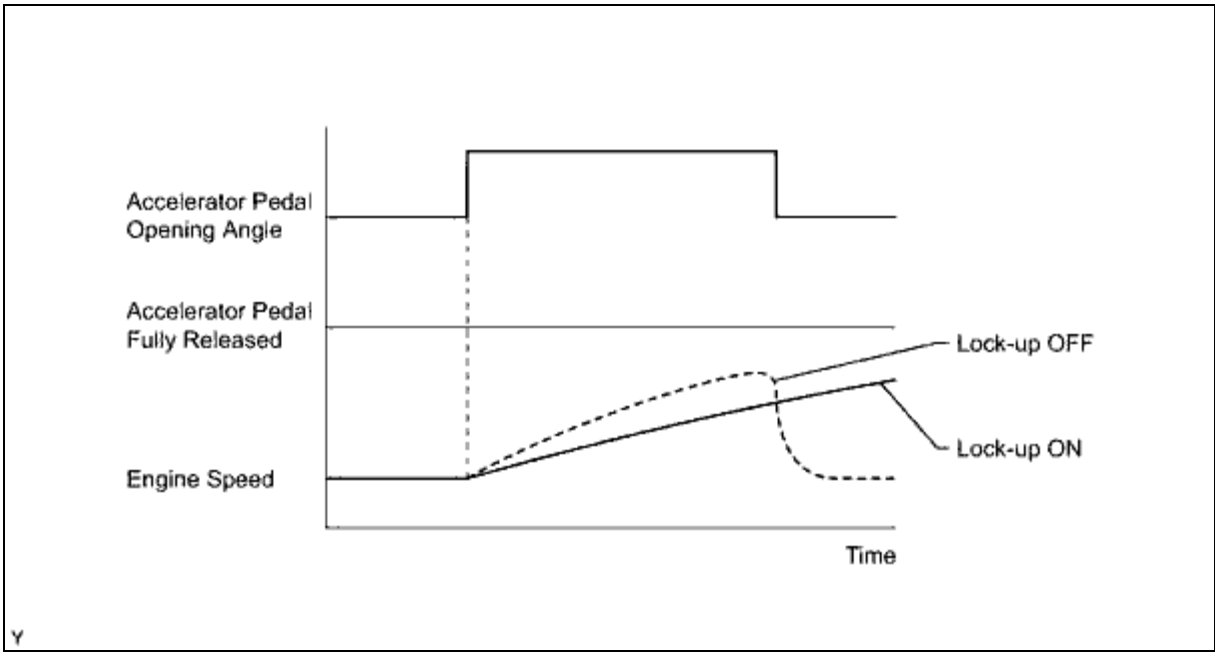
HINT:

This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)



PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0741)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

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RESULT	PROCEED TO
Only DTC P0741 is output	A
P0741 and other DTCs are output	B

HINT:

If any other codes besides P0741 are output, perform the troubleshooting for those DTCs first.

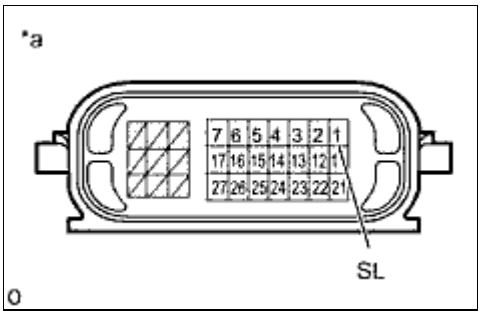
B ▶ **GO TO DTC CHART**

A

▼

2.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 6**

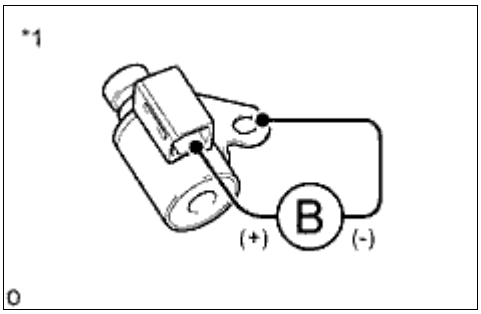
OK

▼

3.	**INSPECT SHIFT SOLENOID VALVE SL (OPERATION)**

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(a) Remove shift solenoid valve SL INFO .



(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

5.	**INSPECT TORQUE CONVERTER ASSEMBLY**

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(a) Check the torque converter assembly INFO .

OK:

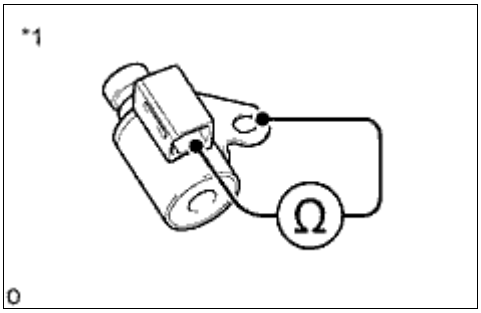
The torque converter operates normally.

NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

6.	**INSPECT SHIFT SOLENOID VALVE SL (RESISTANCE)**

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VT08IX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0746; Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1); 2016 MY Tacoma [08/2015 -]		

DTC	**P0746**	**Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0746	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 1st, 2nd, 3rd or 4th gear is commanded. • Either condition is met twice: ○ When a shift to 5th gear is commanded, 4th gear is engaged. ○ When a shift to 6th gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL1 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0746: Shift solenoid valve SL1 OFF malfunction Shift solenoid valve SL1 ON malfunction
Required sensors/Components	Shift solenoid valve SL1, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles

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Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

HINT:

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*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction:

ECM selected gear	1st, 2nd, 3rd or 4th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction:

ECM selected gear	5th or 6th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

[ON malfunction]

2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.

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3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0746)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0746 is output	A
P0746 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

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HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this

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lowered limit, the engine speed will increase freely.

- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)**

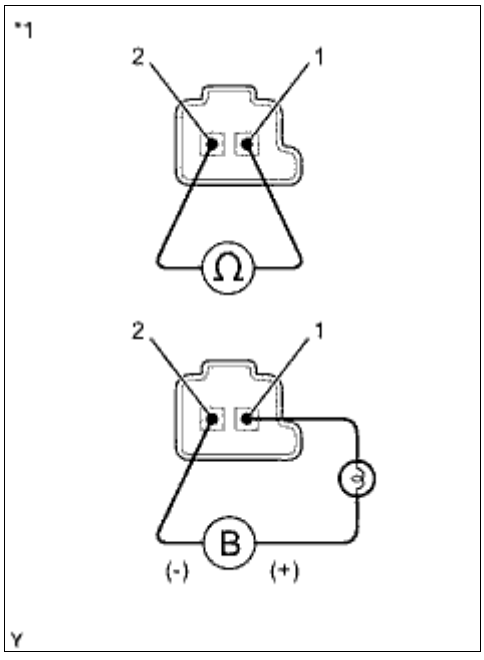
D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)**

E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)**

A ▼

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an

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operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL1

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL1**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8F0L8X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0748; Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1); 2016 MY Tacoma [08/2015 -]		

DTC	**P0748**	**Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0748	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL1 circuit while driving and shifting gears (SL1 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL1 circuit • Shift solenoid valve SL1 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL1 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL1 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0748: Shift solenoid valve SL1/Range check
Required sensors/Components	Shift solenoid valve SL1
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

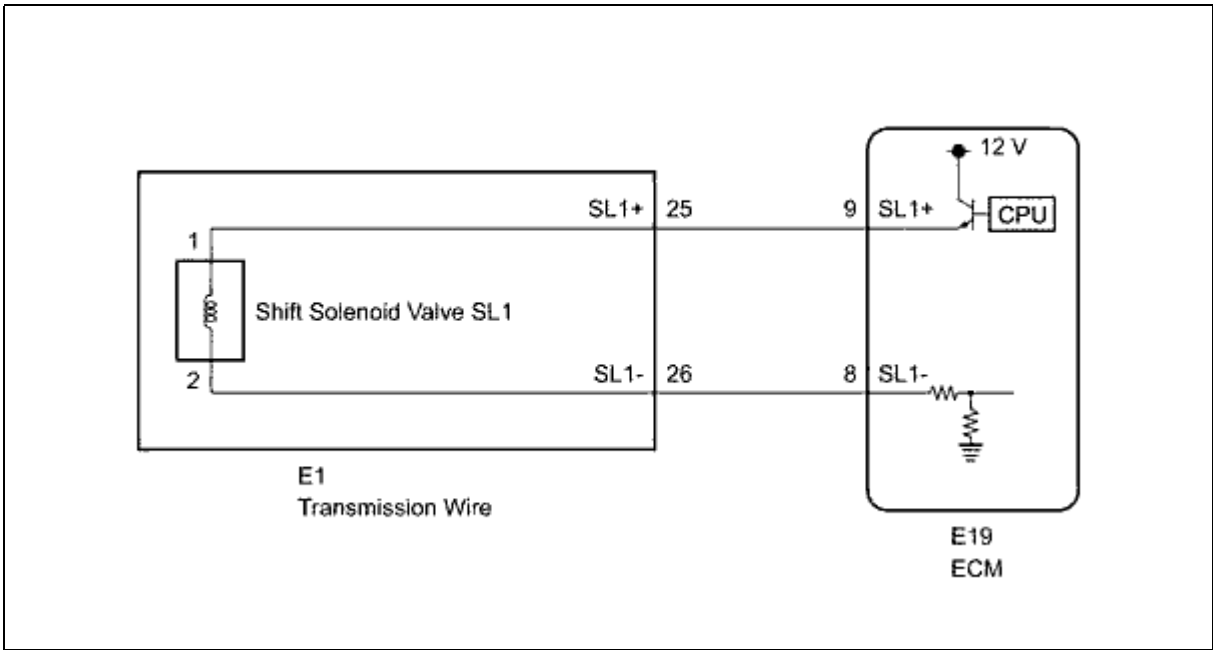
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL1 when the shift lever is in D:

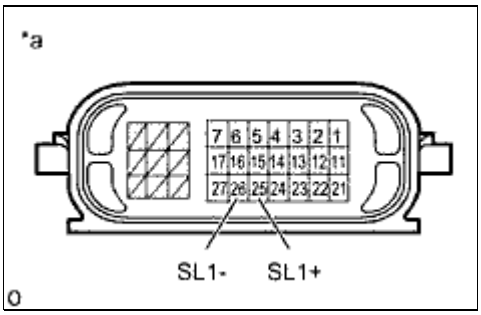
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL1	ON	ON	ON	ON	OFF	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL1)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
25 (SL1+) - 26 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
25 (SL1+) - Body ground	Always	10 kΩ or higher
26 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

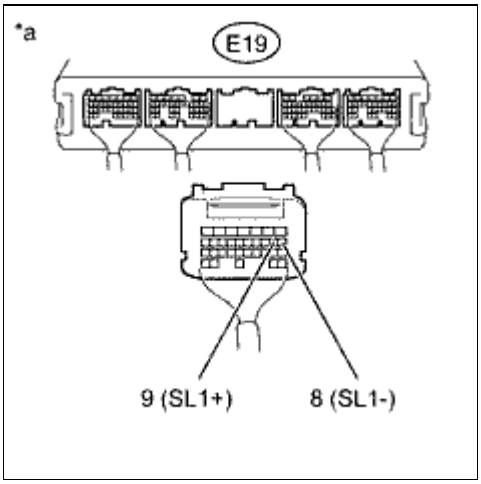
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-9 (SL1+) - E19-8 (SL1-)	20°C (68°F)	5.0 to 5.6 Ω
E19-9 (SL1+) - Body ground	Always	10 kΩ or higher
E19-8 (SL1-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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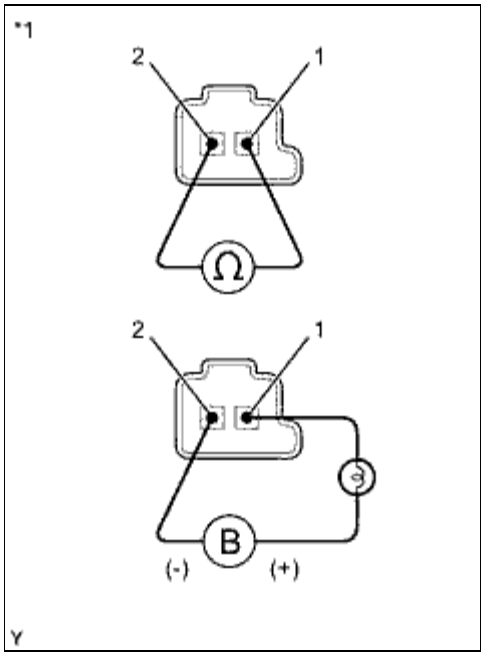
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL1**

(a) Remove shift solenoid valve SL1 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL1

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL1

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VU08SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0776; Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2); 2016 MY Tacoma [08/2015 -]		

DTC	**P0776**	**Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0776	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 4th, 5th or 6th gear is commanded. • One of the following conditions is met twice: ○ When a shift to 1st gear is commanded, 4th gear is engaged. ○ When a shift to 2nd gear is commanded, 4th gear is engaged. ○ When a shift to 3rd gear is commanded, 4th gear is engaged.	• Shift solenoid valve SL2 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0776: Shift solenoid valve SL2/OFF malfunction Shift solenoid valve SL2/ON malfunction
Required sensors/Components	Shift solenoid valve SL2, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction: 0.5 sec. ON malfunction: 0.8 sec.

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MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

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HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction:

ECM selected gear	4th, 5th or 6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

ON malfunction (A):

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (B):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

ON malfunction (C):

ECM selected gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

OFF malfunction:

Turbine speed - Output speed x Gear ratio	1000 rpm or more

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[ON malfunction]

One of the following conditions is met: ON malfunction (A), (B) or (C)

2 detections are necessary per driving cycle:

1st detection: temporary flag ON

2nd detection: pending fault code ON

ON malfunction (A), (B) or (C):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0776)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0776 is output	A
P0776 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B

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2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

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ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO STEP 3**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)**

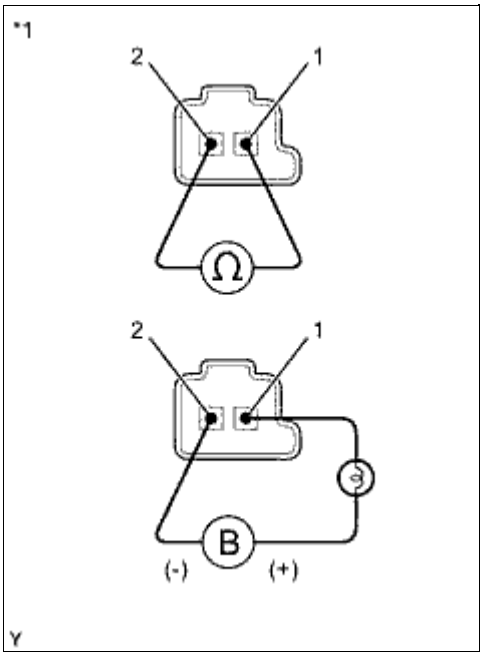
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

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(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL2**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8G0JZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0778; Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2); 2016 MY Tacoma [08/2015 -]		

DTC	**P0778**	**Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0778	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL2 circuit while driving and shifting gears (SL2 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL2 circuit • Shift solenoid valve SL2 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL2 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL2 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0778: Shift solenoid valve SL2/Range check
Required sensors/Components	Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

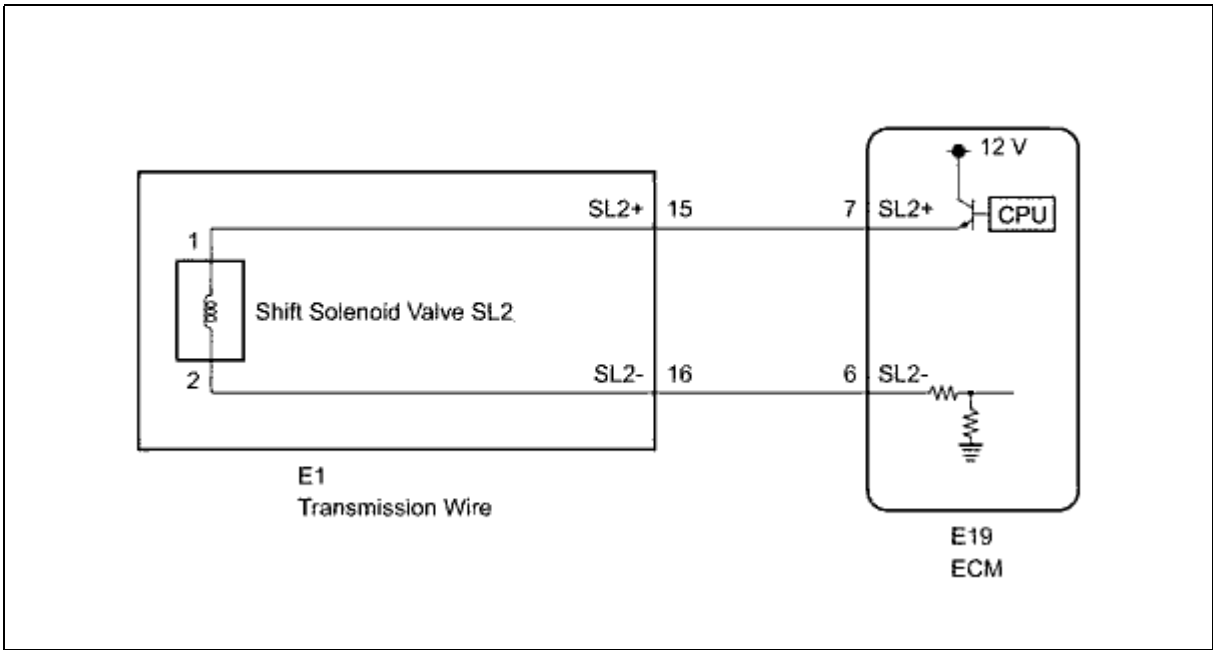
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL2 when the shift lever is in D:

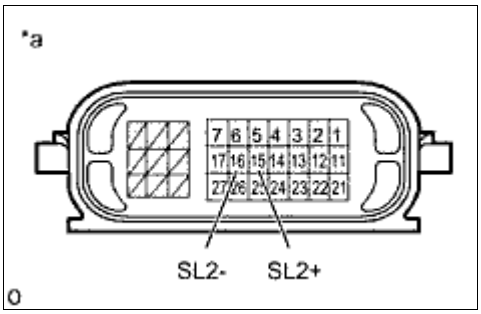
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL2	OFF	OFF	OFF	ON	ON	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test.
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL2)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
15 (SL2+) - 16 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
15 (SL2+) - Body ground	Always	10 kΩ or higher
16 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

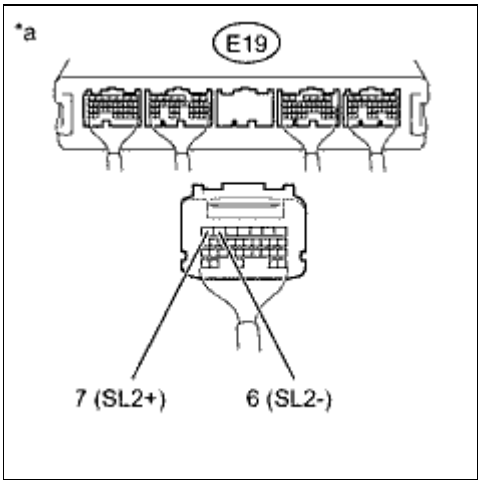
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-7 (SL2+) - E19-6 (SL2-)	20°C (68°F)	5.0 to 5.6 Ω
E19-7 (SL2+) - Body ground	Always	10 kΩ or higher
E19-6 (SL2-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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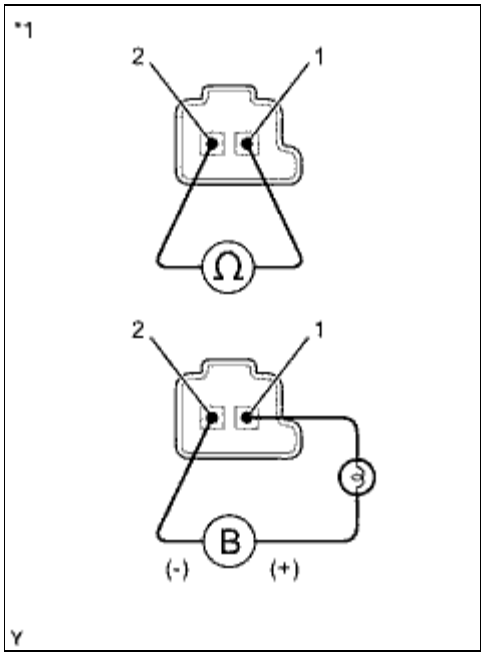
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL2**

(a) Remove shift solenoid valve SL2 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL2

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL2

OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015VV08QX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0796; Pressure Control Solenoid "C" Performance (Shift Solenoid Valve SL3); 2016 MY Tacoma [08/2015 -]		

DTC	**P0796**	**Pressure Control Solenoid "C" Performance (Shift Solenoid Valve SL3)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0796	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 2nd or 6th gear is commanded. • The following condition is met twice: When a shift to 1st gear is commanded, 2nd gear is engaged.	• Shift solenoid valve SL3 remains open or closed. • Transmission valve body assembly is blocked. • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0796: Shift solenoid valve SL3/OFF malfunction Shift solenoid valve SL3/ON malfunction
Required sensors/Components	Shift solenoid valve SL3, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C) and (D): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

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TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

HINT:

*: Following conditions are met

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Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction (A):

ECM selected gear	2nd
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (B):

ECM selected gear	6th
Throttle valve opening angle	3% or more
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL3	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)

OFF malfunction (C):

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle: (When condition "D" is not detected)	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
Throttle valve opening angle: (When condition "D" is detected)	0% or more at output speed 900 rpm (Condition varies with output speed)
ECT (engine coolant temperature)	40°C (104°F) or higher

OFF malfunction (D):

Throttle valve opening angle	0% or more at output speed 900 rpm (Condition varies with output speed)

ON malfunction:

ECM selected gear	1st
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (engine coolant temperature)	40°C (104°F) or higher

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TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or ((C) and (D))

OFF malfunction (A):

Turbine speed - Output speed x 2nd gear ratio	1000 rpm or more

OFF malfunction (B):

Turbine speed - Output speed x 6th gear ratio	1000 rpm or more

OFF malfunction (C) and (D):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.724

[ON malfunction]

2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction:

Turbine speed / Output speed when output speed less than 1000 rpm	1.95 to 2.4

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0796)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

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(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P0796 is output	A
P0796 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes.

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
		occurs	Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

C ▶ **GO TO STEP 3**

D ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)**

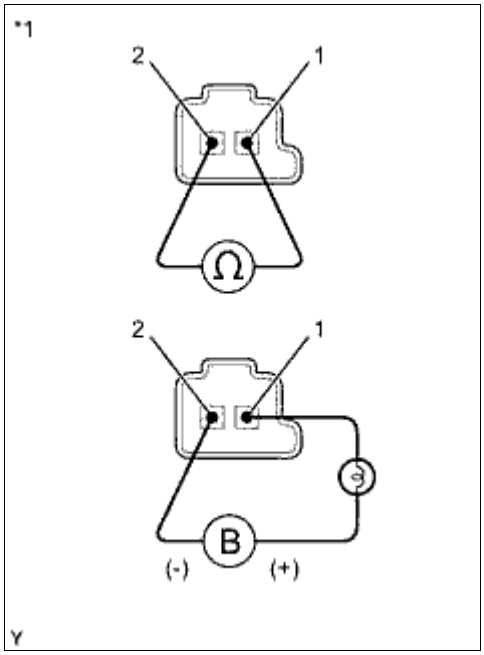
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E ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)

A ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)

3.	INSPECT SHIFT SOLENOID VALVE SL3

(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL3

OK ▼

4.	INSPECT TRANSMISSION VALVE BODY ASSEMBLY

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY

OK ▶ REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000015W808IX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P0798; Pressure Control Solenoid "C" Electrical (Shift Solenoid Valve SL3); 2016 MY Tacoma [08/2015 -]		

DTC	**P0798**	**Pressure Control Solenoid "C" Electrical (Shift Solenoid Valve SL3)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0798	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL3 circuit while driving and shifting gears (SL3 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL3 circuit • Shift solenoid valve SL3 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL3 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL3 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P0798: Shift solenoid valve SL3/Range check
Required sensors/Components	Shift solenoid valve SL3
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

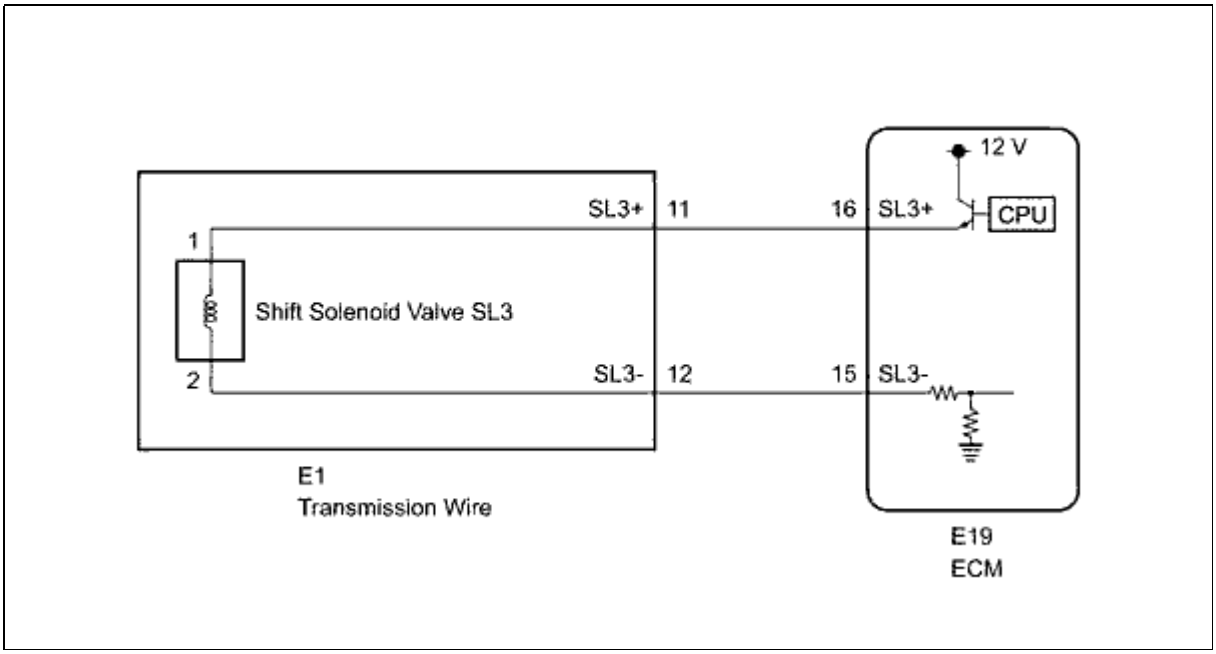
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL3 when the shift lever is in D:

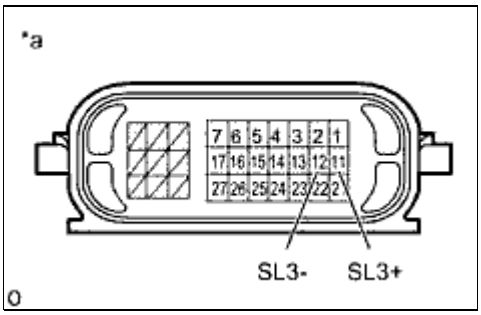
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL3	OFF	ON	OFF	OFF	OFF	ON

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL3)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
11 (SL3+) - 12 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
11 (SL3+) - Body ground	Always	10 kΩ or higher
12 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

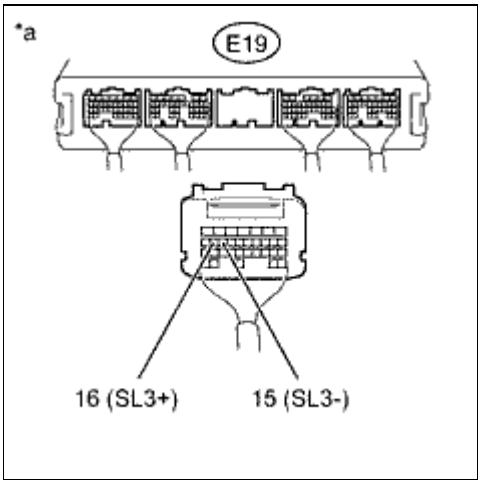
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-16 (SL3+) - E19-15 (SL3-)	20°C (68°F)	5.0 to 5.6 Ω
E19-16 (SL3+) - Body ground	Always	10 kΩ or higher
E19-15 (SL3-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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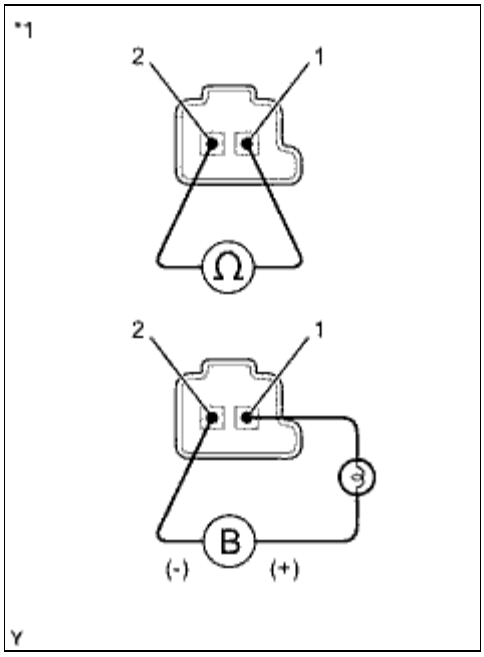
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL3**

(a) Remove shift solenoid valve SL3 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL3

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL3

OK ▶ REPLACE TRANSMISSION WIRE

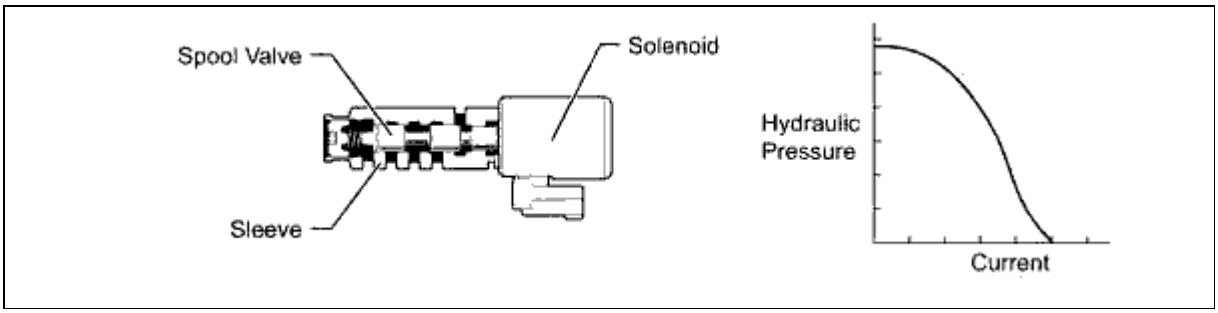
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W830PPX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2714; Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT); 2016 MY Tacoma [08/2015 -]		

DTC	**P2714**	**Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)**

SYSTEM DESCRIPTION

The shift solenoid valve SLT controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the current to shift solenoid valve SLT to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2714	The ECM detects a malfunction in the shift solenoid valve SLT (ON side) according to the difference in the speed between the turbine and the output shaft, and also by the ATF pressure. (2 trip detection logic)	• Shift solenoid valve SLT remains open • Shift solenoid valve SL1, SL2, SL3 or SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

The ECM calculates the amount of clutch slip based on the input turbine speed, output shaft speed, and gear ratio. If the amount of clutch slip exceeds a specified level, the ECM will set this DTC and illuminate the MIL.

When shift solenoid valve SLT remains on, the line pressure goes down and clutch engagement force decreases.

NOTICE:

If the vehicle continues to be driven under these conditions, the clutch will burn up and the vehicle will no longer be drivable.

MONITOR STRATEGY

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Related DTCs	P2714: Shift solenoid valve SLT/ON malfunction
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	ON malfunction: 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ON malfunction:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2716 (Shift solenoid valve SLT circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLT circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down

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Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: ON malfunction (A), (B), (C), (D), (E), (F) or (G)

ON malfunction (A):

Summation of clutch heat generations	Specified value

ON malfunction (B):

Shift solenoid valve SL1 ON malfunction	Detected

ON malfunction (C):

Shift solenoid valve SL1 OFF malfunction	Detected

ON malfunction (D):

Shift solenoid valve SL2 OFF malfunction	Detected

ON malfunction (E):

Shift solenoid valve SL3 OFF malfunction	Detected

ON malfunction (F):

Shift solenoid valve SL4 ON malfunction	Detected

ON malfunction (G):

Shift solenoid valve SL4 OFF malfunction	Detected

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P2714)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P2714 is output	A
P2714 and other DTCs are output	B

HINT:

If a solenoid is stuck on, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 4**

B ▼

2.	**PERFORM ACTIVE TEST USING TECHSTREAM (ACTIVATE THE SOLENOID (SLT))**

NOTICE:

- Perform the test while the ATF (Automatic Transmission Fluid) temperature is between 50 and 80°C (122 and 176°F).
- Be careful to prevent the hose of SST from interfering with the exhaust pipe.

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- This check must be conducted after checking and adjusting the engine.
- Perform the test with the air conditioning off.

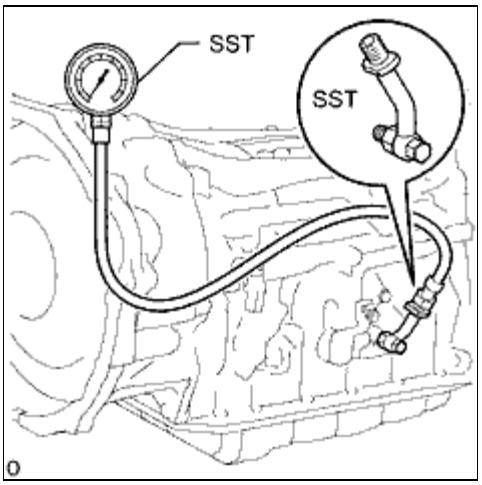
HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Turn the ignition switch off.

(b) Lift the vehicle up.

(c) Remove the test plug from the transmission case and connect SST.



SST: 09993-19015

09993-00010

09993-00040

(d) Lower the vehicle.

(e) Fully apply the parking brake and chock the 4 wheels.

(f) Connect the Techstream to the DLC3.

(g) Start the engine.

(h) Warm up the ATF (Automatic Transmission Fluid).

(i) Measure the line pressure when the engine is idling.

(j) Turn the Techstream on.

(k) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(l) Follow the instructions on the Techstream and perform the Active Test.

(m) Measure the line pressure with SST.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the	Operates shift	ON/OFF	[Vehicle Condition]

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Solenoid (SLT)*	solenoid valve SLT to raise the line pressure.	**HINT:** ON: No action (normal operation) OFF: Line pressure up (When the Active Test of "Activate the Solenoid (SLT)" is performed, the ECM commands the shift solenoid valve SLT to turn off).	• Vehicle Stopped • Engine idling

*: The "Activate the solenoid (SLT)" Active Test is performed to allow confirmation that the line pressure changes. The line pressure changes are confirmed using the same SST that is used for the Hydraulic Test INFO .

HINT:

Note that the pressure readings for the Active Test and Hydraulic Test are different.

OK:

The line pressure changes as specified when performing the Active Test.

NG ▶ **GO TO STEP 4**

OK ▼

3.	**PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)**

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE

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TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

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C ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)

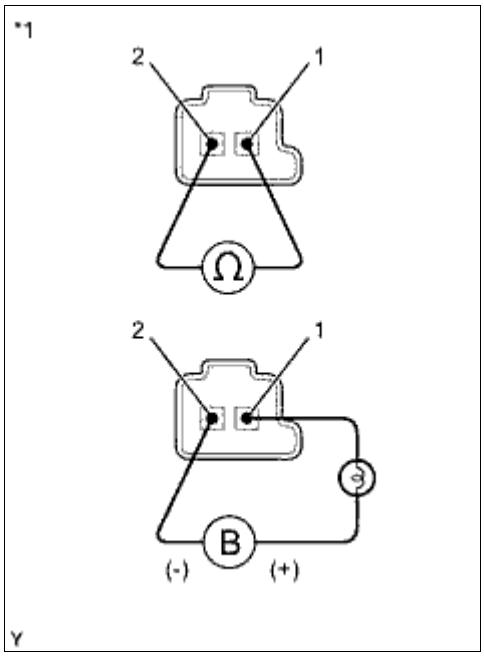
D ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL4 PERFORMANCE DTC P2808)

E ▶ GO TO STEP 4

A ▶ GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)

4.	**INSPECT SHIFT SOLENOID VALVE SLT**

(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

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Text in Illustration

*1	Shift Solenoid Valve SLT

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLT**

OK ▼

5.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8A0OFX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2716; Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT); 2016 MY Tacoma [08/2015 -]		

DTC	**P2716**	**Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)**

DESCRIPTION

Refer to the system description for DTC P2714 INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2716	Open or short is detected in shift solenoid valve SLT circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM

MONITOR DESCRIPTION

When an open or short in the shift solenoid valve SLT circuit is detected, the ECM interprets this as a fault. The ECM will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2716: Shift solenoid valve SLT/Range check
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Solenoid current cut status	Not cut
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

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Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

Condition (D):

Battery voltage	11 V or higher
Target current	1 A or higher

Condition (E):

Battery voltage	11 V or higher
Target current	0.1 A or more
| Target voltage - Last Target voltage |	Less than 0.000019 V

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B), (C) or (D)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

Output duty cycle	0% or less

Condition (D):

Solenoid voltage monitor	No signal

Condition (E):

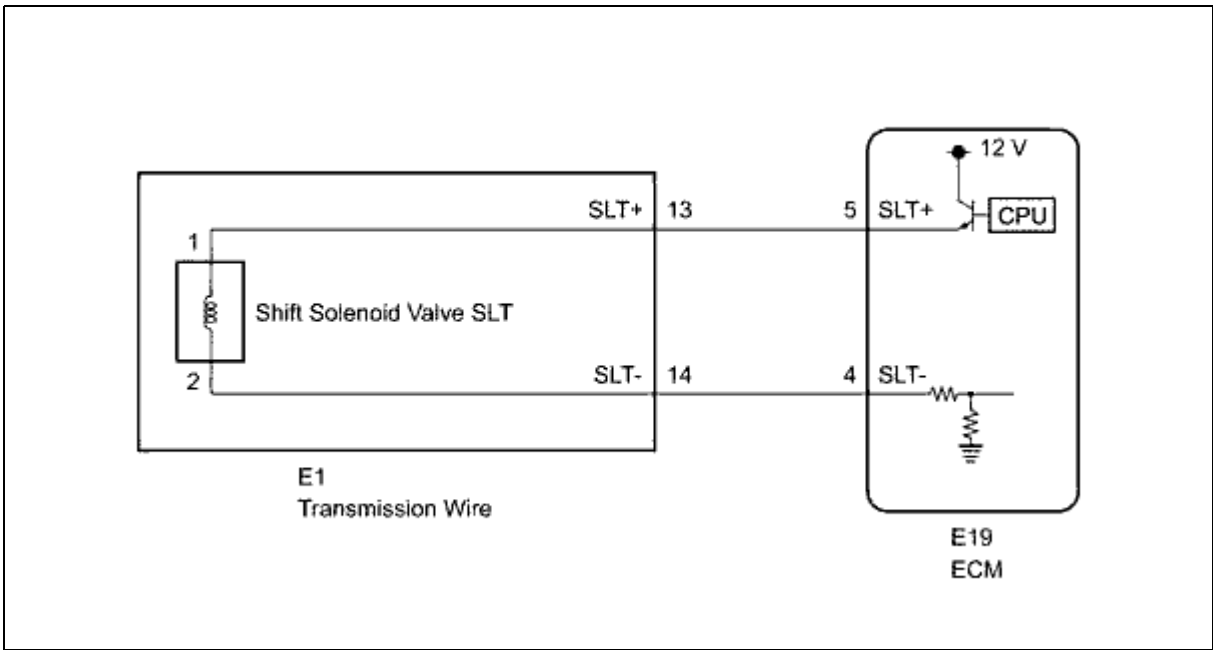
| Target voltage - Average of monitor voltage |	0.035 V or more

COMPONENT OPERATING RANGE

Output duty cycle	More than 3%, and less than 100%
Solenoid voltage monitor	Signal input
| Target voltage - Average of monitor voltage |	Less than 0.035 V

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WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

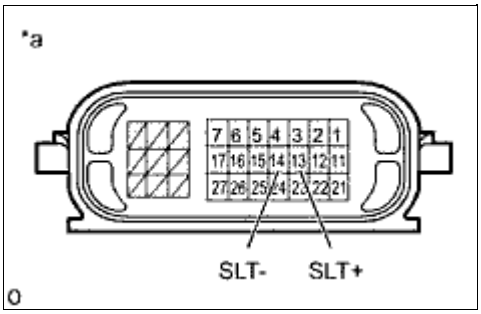
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine.
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLT)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
13 (SLT+) - 14 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
13 (SLT+) - Body ground	Always	10 kΩ or higher
14 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

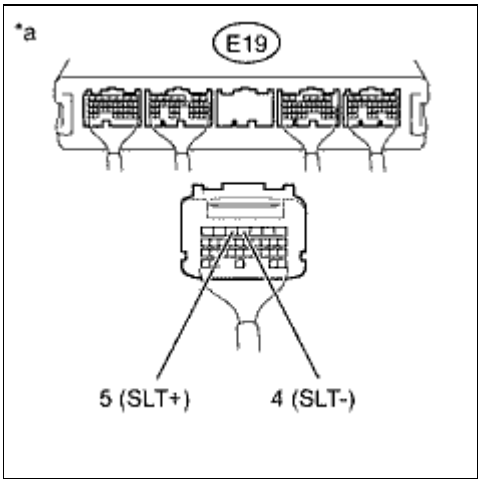
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-5 (SLT+) - E19-4 (SLT-)	20°C (68°F)	5.0 to 5.6 Ω
E19-5 (SLT+) - Body ground	Always	10 kΩ or higher
E19-4 (SLT-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

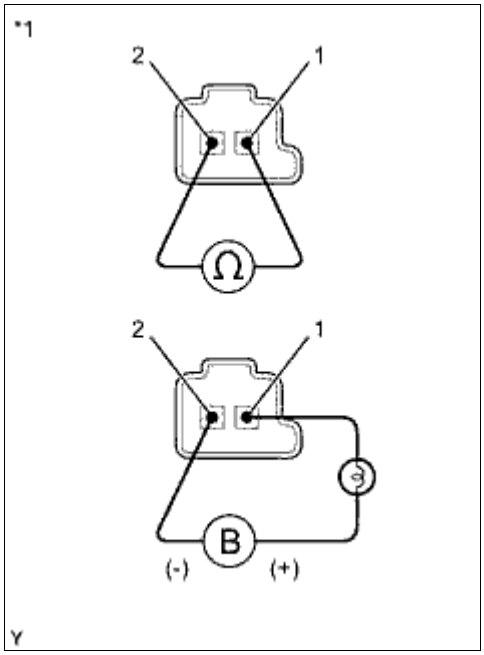
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NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▶ REPLACE ECM

3.	**INSPECT SHIFT SOLENOID VALVE SLT**

(a) Remove shift solenoid valve SLT INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLT

NG ▶ REPLACE SHIFT SOLENOID VALVE SLT

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OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000012XR0AEX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2742,P2743; Transmission Fluid Temperature Sensor "B" Circuit Low Input; 2016 MY Tacoma [08/2015 -]		

DTC	**P2742**	**Transmission Fluid Temperature Sensor "B" Circuit Low Input**

DTC	**P2743**	**Transmission Fluid Temperature Sensor "B" Circuit High Input**

DESCRIPTION

The No. 2 ATF temperature sensor is installed in the transmission valve body assembly.

If the ECM detects an abnormally high ATF temperature near this sensor, it illuminates the warning indicator.

HINT:

- The temperature of ATF easily rises when towing, climbing hills, in traffic, etc.
- If the No. 2 ATF temperature sensor becomes short-circuited, the signal that indicates that the ATF temperature is 150°C (302°F) or higher is input into the ECM.

Vehicle conditions when the sensor is normal and when the sensor is short-circuited are indicated in the table below.

NO. 2 ATF TEMPERATURE SENSOR STATE	DETECTION CONDITION	SYMPTOM	RECOVERY CONDITION
Sensor is normal	ATF temperature higher than 150°C (302°F)	ATF temperature warning indicator remains on	ATF temperature below 135°C (275°F)*1
	ATF temperature higher than 130°C (266°F)	Shift point too high	ATF temperature below 110°C (230°F)
Sensor is short-circuited	Any conditions	Shift point too high	Symptoms still occur
	Engine coolant temperature higher than 95°C (203°F)	Lock-up at 3rd gear*2	Symptoms still occur

HINT:

*1: When ATF temperature is in the normal range, it decreases to below 135°C (275°F) within 5 minutes with the shift lever in P or N in an idling state.

*2: When ATF temperature is normal, transmission lock-up occurs in 4th, 5th and 6th gear with the shift lever in D or with the S6 range selected, in 4th or 5th gear with the S5 range selected, and 4th gear with the S4 range selected.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
P2742	No. 2 ATF temperature sensor resistance is below 25 Ω for 0.5 seconds or more (1 trip detection logic).	• Short in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature

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DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
		sensor (transmission wire) • ECM
P2743	No. 2 ATF temperature sensor resistance is higher than 156 kΩ for 0.5 seconds or more and either condition is met (1 trip detection logic): (A) 15 minutes or more have elapsed after the engine start when the engine coolant temperature or intake air temperature is -29.375°C (-20.875°F) or less. (B) 10 seconds or more have elapsed after the engine start when the engine coolant temperature and intake air temperature are higher than -29.375°C (-20.875°F).	• Open in No. 2 ATF temperature sensor circuit • No. 2 ATF temperature sensor (transmission wire) • ECM

MONITOR DESCRIPTION

The No. 2 ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the No. 2 ATF temperature sensor circuit. If the resistance value of the No. 2 ATF temperature sensor is below 25 Ω*1 or higher than 156 kΩ*2, the ECM interprets this as a fault in the No. 2 ATF temperature sensor or wiring. The ECM stores the DTC.

*1: 150°C (302°F) or higher is indicated regardless of the actual ATF temperature.

*2: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the Techstream display.

WIRING DIAGRAM

Refer to DTC P0712 INFO .

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Start the engine and wait for 15 minutes or more.
2. Check for DTCs again INFO .

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

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NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List.

(g) According to the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
A/T Oil Temperature 2	No. 2 ATF temperature sensor value/ Min.: -40°C (-40°F) Max.: 150°C (302°F)	• Approx. 80°C (176°F): After stall test • Equal to ambient temperature when cold soak	If the value -40°C (-40°F) or 150°C (302°F), No. 2 ATF temperature sensor circuit is open or shorted.

HINT:

- When DTC P2742 is output and the Techstream indicates 150°C (302°F) or higher, there is a short circuit.
- When DTC P2743 is output and the Techstream indicates -40°C (-40°F), there is an open circuit.

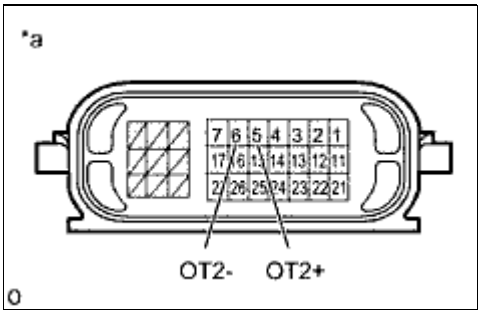
Check the temperature displayed on the Techstream in order to check if a malfunction exists.

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
150°C (302°F) or higher	Short circuit

PROCEDURE

1.	**INSPECT NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
5 (OT2+) - Body ground	Always	10 kΩ or higher
6 (OT2-) - Body ground	Always	10 kΩ or higher

HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

Text in Illustration

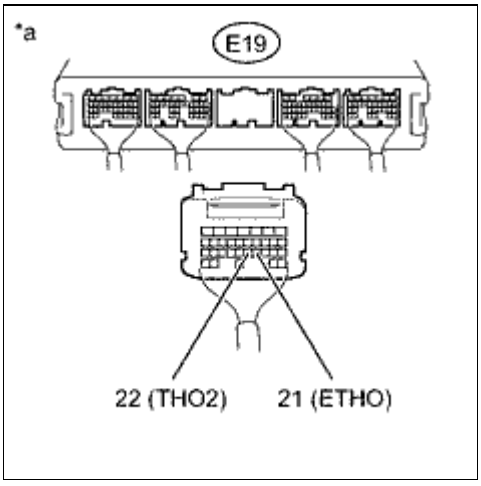
*a	Component without harness connected (Transmission Wire)

NG ▶ **REPLACE NO. 2 ATF TEMPERATURE SENSOR (TRANSMISSION WIRE)**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-22 (THO2) - E19-21 (ETHO)	Always	25 Ω to 156 kΩ
E19-22 (THO2) - Body ground	Always	10 kΩ or higher
E19-21 (ETHO) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

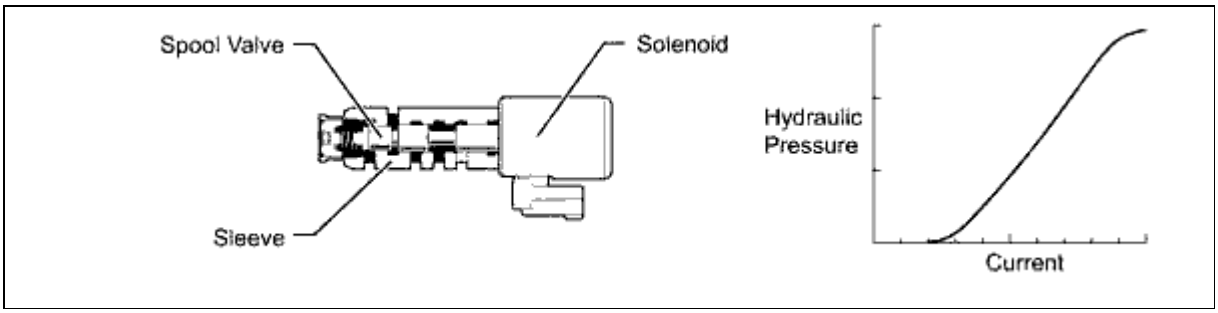
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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W8D0K9X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2757; Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU); 2016 MY Tacoma [08/2015 -]		

DTC	**P2757**	**Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU)**

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, mass air flow meter, input turbine speed sensor, output shaft speed sensor and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.



The ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect shift solenoid valve SLU, transmission valve body assembly and torque converter assembly mechanical problems.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2757	Both conditions are met (2 trip detection logic): • Lock-up does not occur when requested. • Lock-up occurs when shift solenoid valve SLU is requested to turn on in the lock-up range.	• Shift solenoid valve SLU remains open or closed • Transmission valve body assembly is blocked • Torque converter assembly • Automatic transmission assembly (clutch, brake or gear, etc.) • Line pressure is too low

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the transmission revolution sensor (NT), transmission revolution sensor (SP2), engine speed, engine load, engine temperature, vehicle speed, transmission fluid temperature and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine speed (NE) to the input turbine speed (NT). The ECM calculates the actual transmission gear by comparing the input turbine speed (NT) to the output shaft speed (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to shift solenoid valve SLU. When shift solenoid valve SLU is turned on, it applies pressure to the lock-up relay valve and locks the torque converter.

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If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in shift solenoid valve SLU or lock-up system performance.

The ECM will illuminate the MIL and store the DTC.

HINT:

Example:

When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.

  (Engine speed is at least 70 rpm more than the input turbine speed.)
- There is no difference in rotation speed between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.

  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P2757: Shift solenoid valve SLU OFF malfunction Shift solenoid valve SLU ON malfunction
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	OFF malfunction: 2 sec. ON malfunction: 1.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit) P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output speed sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P2759 (Shift solenoid valve SLU circuit) P2769, P2770 (Shift solenoid valve SL circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system))

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	U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
Shift solenoid valve SLU circuit	Not circuit malfunction
Shift solenoid valve SL circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher
Engine	Running
ECT (Engine coolant temperature)	40°C (104°F) or higher
Spark advance from Max. retard timing by KCS control	0°CA or more
ECM selected gear	Not 1st
Vehicle speed	25 km/h (15.5 mph) or more
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376

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Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction:

ECM lock-up command	ON (SL on, SLU pressure: 513 kPa (5.2 kgf/cm ^{2} , 74 psi) or higher)
Duration time from lock-up on command	3 sec. or more
Shift solenoid valve SLU (P2757)	Not ON malfunction

ON malfunction:

ECM lock-up command	OFF (SLU pressure: Below 4 kPa (0.04 kgf/cm ^{2} , 0.6 psi))
Duration time from SLU command	3 sec. or more
Duration time from SL command ON	0.064 sec. or more
Shift solenoid valve SL	Not OFF malfunction
Throttle valve opening angle	8.5% or more at turbine speed of 3000 rpm (Condition varies with turbine speed)
Vehicle speed when ECM selected 2nd, 3rd or 4th gear	Less than 35 km/h (21.8 mph)
Vehicle speed when ECM selected 5th gear	Less than 50 km/h (31.1 mph)
Vehicle speed when ECM selected 6th gear	Less than 60 km/h (37.3 mph)

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction:

| Engine speed - Turbine speed |	70 rpm or more

ON malfunction:

| Engine speed - Turbine speed |	Less than 35 rpm

COMPONENT OPERATING RANGE

Transmission revolution sensor (NT)	Input speed is equal to engine speed when lock-up is ON.

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

1. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Activate the Lock Up	Controls the shift solenoid valves SLU and SL to set the automatic transmission to the lock-up condition.	ON/OFF	Can be used to check shift solenoid valves SLU and SL operation. [Vehicle Condition] Vehicle speed: 60 km/h (36 mph) or more

HINT:

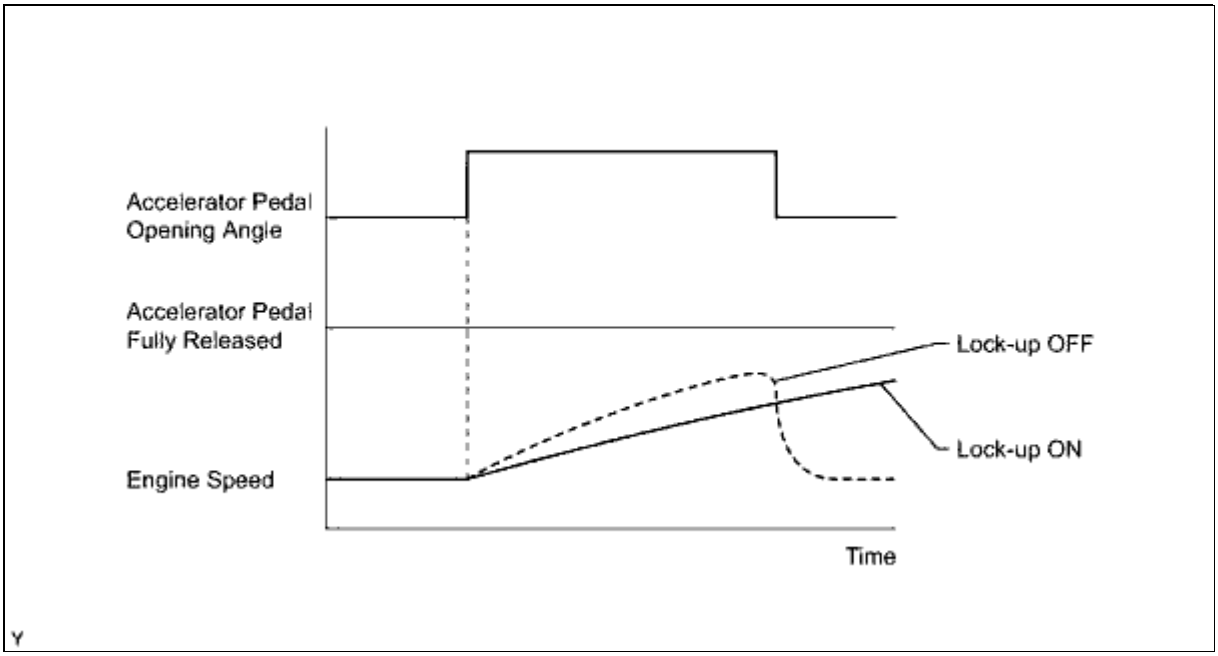
This test can be conducted when the vehicle speed is 80 km/h (50 mph) or more.

(h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release the accelerator pedal in order to decelerate, but do not fully release the pedal. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off.)

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PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P2757)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P2757 is output	A
P2757 and other DTCs are output	B

HINT:

If any DTCs other than P2757 are output, perform troubleshooting for those DTCs first.

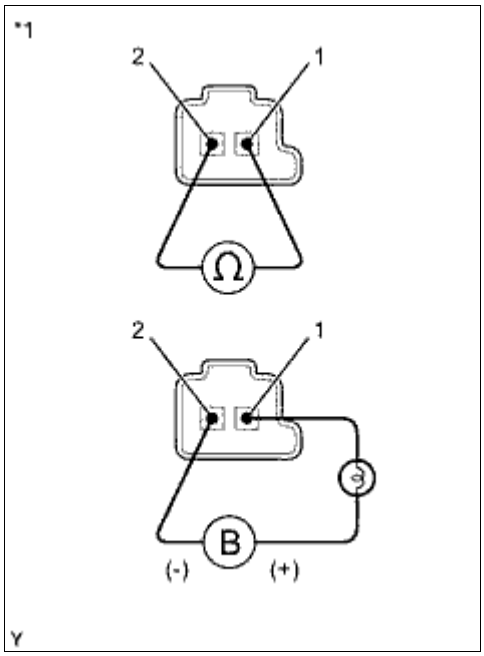
B ▶ **GO TO DTC CHART**

A ▼

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2.	**INSPECT SHIFT SOLENOID VALVE SLU**

(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▼

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3.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▼

4.	**INSPECT TORQUE CONVERTER ASSEMBLY**

(a) Check the torque converter assembly INFO .

OK:

The torque converter assembly operates normally.

NG ▶ **REPLACE TORQUE CONVERTER ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000000W890LXX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2759; Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU); 2016 MY Tacoma [08/2015 -]		

DTC	**P2759**	**Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU)**

DESCRIPTION

Refer to the system description for DTC P2757 INFO .

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2759	Open or short is detected in shift solenoid valve SLU circuit for 1 second or more while driving (1 trip detection logic).	• Open or short in shift solenoid valve SLU circuit • Shift solenoid valve SLU • ECM

MONITOR DESCRIPTION

When an open or short in a shift solenoid valve SLU circuit is detected, the ECM determines there is a malfunction. The ECM will illuminate the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P2759: Shift solenoid valve SLU/Range check
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Ignition switch	ON
Starter	OFF

Condition (A):

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Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

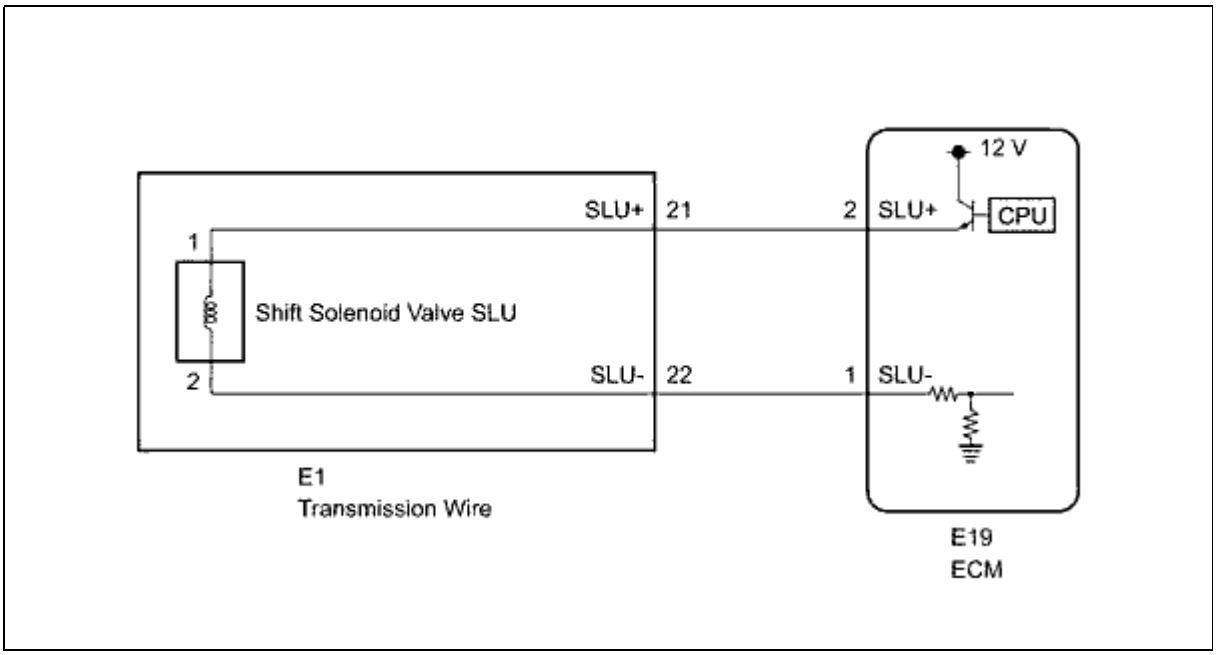
Condition (C):

Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM



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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

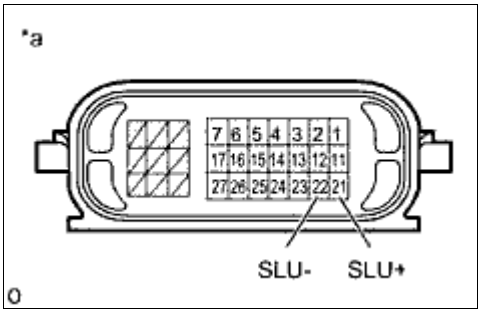
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .
2. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SLU)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
21 (SLU+) - 22 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
21 (SLU+) - Body ground	Always	10 kΩ or higher
22 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Transmission Wire)

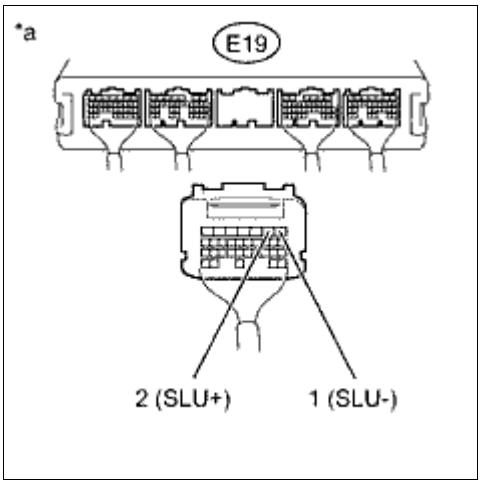
NG ▶ **GO TO STEP 3**

OK ▼

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2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-2 (SLU+) - E19-1 (SLU-)	20°C (68°F)	5.0 to 5.6 Ω
E19-2 (SLU+) - Body ground	Always	10 kΩ or higher
E19-1 (SLU-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

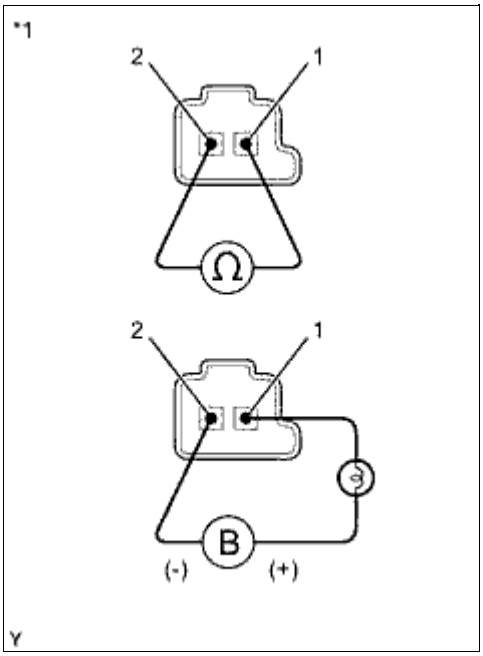
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SLU**

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(a) Remove shift solenoid valve SLU INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SLU

NG ▶ **REPLACE SHIFT SOLENOID VALVE SLU**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000001IYS05SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2769,P2770; Short in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL); 2016 MY Tacoma [08/2015 -]		

DTC	**P2769**	**Short in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)**

DTC	**P2770**	**Open in Torque Converter Clutch Solenoid Circuit (Shift Solenoid Valve SL)**

DESCRIPTION

Shift solenoid valve SL is turned on and off by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2769	ECM detects a short in the shift solenoid valve SL circuit when the shift solenoid valve SL is operated (2 trip detection logic).	• Short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM
P2770	ECM detects an open in the shift solenoid valve SL circuit when the shift solenoid valve SL is not operated (2 trip detection logic).	• Open in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM

Fail-safe function:

If the ECM detects a malfunction, it turns shift solenoid valve SL off.

MONITOR DESCRIPTION

Based on the signals from the throttle position sensor, the air flow meter and the crankshaft position sensor, the ECM sends a signal to shift solenoid valve SL to regulate the hydraulic pressure and provide smoother torque converter engagement. Shift solenoid valve SL responds to commands from the ECM. The valve controls the lock-up relay valve to perform the torque-converter lock-up function. If the ECM detects an open or short in the shift solenoid valve SL circuit, it will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2769: Shift solenoid valve SL/Range check P2770: Shift solenoid valve SL/Range check
Required sensors/Components	Shift solenoid valve SL
Frequency of operation	Continuous
Duration	1 time

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MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	None
Battery voltage	8 V or higher
Ignition switch	ON
Starter	OFF
Command to shift solenoid valve SL	ON

P2769:

Time after command to solenoid OFF to ON	0.008 sec. or more

P2770:

Time after command to solenoid ON to OFF	0.008 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

P2769:

Solenoid terminal voltage level	Low

P2770:

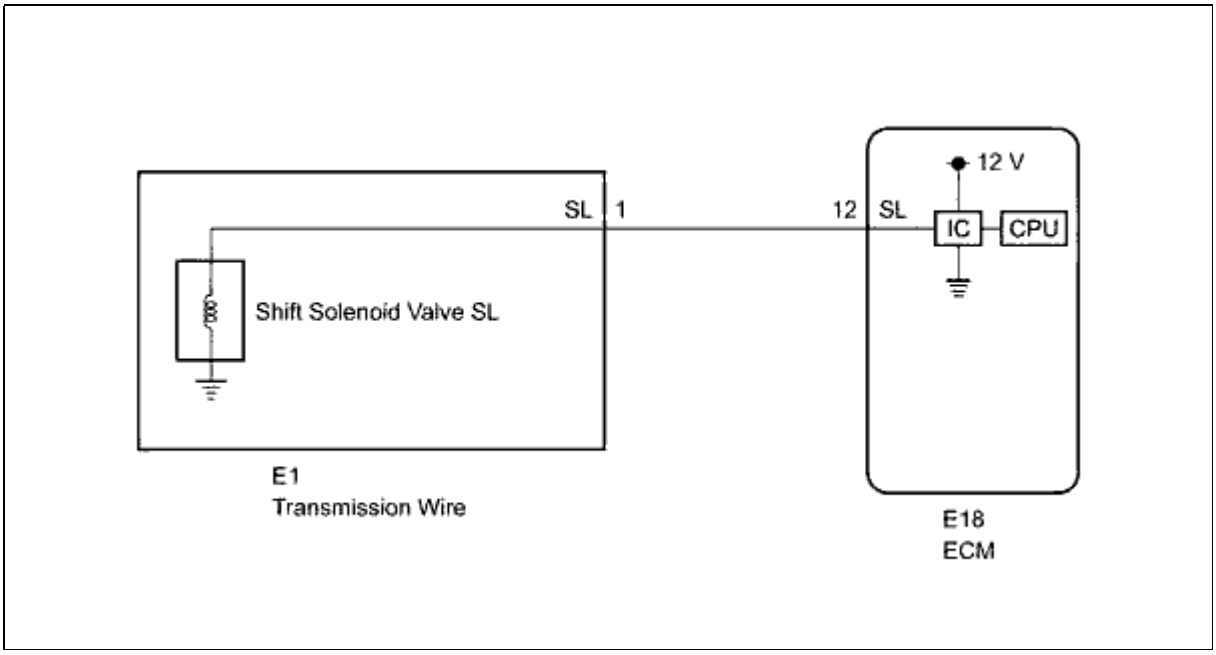
Solenoid terminal voltage level	High

COMPONENT OPERATING RANGE

Solenoid terminal voltage level (Command to solenoid ON)	High
Solenoid terminal voltage level (Command to solenoid OFF)	Low

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

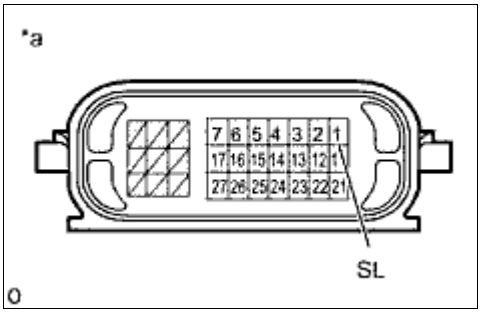
After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the Lock-up Function in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL)**

(a) Disconnect the E1 transmission wire connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

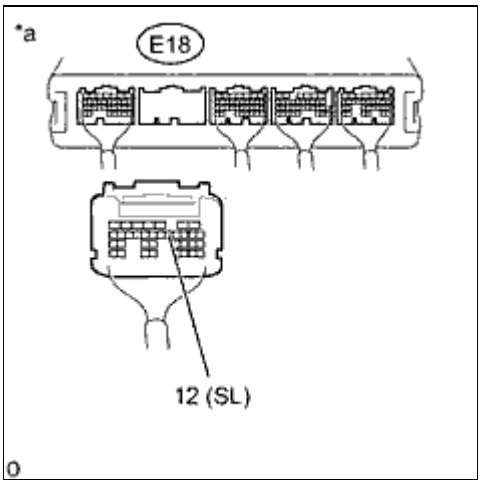
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E18-12 (SL) - Body ground	20°C (68°F)	11 to 15 Ω

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

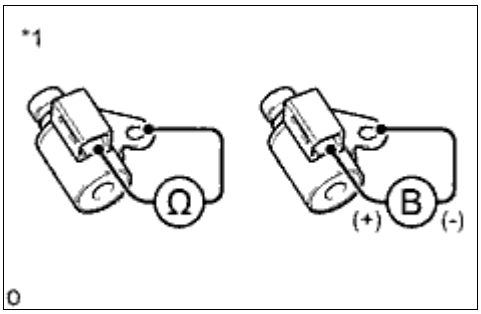
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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3.	INSPECT SHIFT SOLENOID VALVE SL

(a) Remove shift solenoid valve SL INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL**

OK ▶ **REPLACE TRANSMISSION WIRE**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000002IR0051X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2773; Four Wheel Drive (4WD) Low Switch Circuit Low; 2016 MY Tacoma [08/2015 -]		

DTC	**P2773**	**Four Wheel Drive (4WD) Low Switch Circuit Low**

DESCRIPTION

The ECM detects the signal from the L4 detection switch.

This DTC indicates that the L4 detection switch remains on.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
P2773	Transfer L4 detection switch remains on while the vehicle is being driven under the following conditions for 1.8 seconds or more (1 trip detection logic): (a) Output shaft speed is between 1000 and 3000 rpm. (b) Transfer position switch is in 2WD or 4H.	• Short in L4 detection switch circuit • Transfer system • ECM

MONITOR DESCRIPTION

The ECM monitors the L4 detection switch to determine when the transfer case L4 gears are engaged. If the transfer case L4 gears remain engaged under the following conditions, the ECM will conclude that there is a malfunction of the L4 detection switch, illuminate the MIL and store the DTC:

- The L4 detection switch indicates that the L4 transfer case gears are engaged.
- The transfer position switch is in 2WD or 4H.
- The transfer case output shaft speed is between 1000 and 3000 rpm.
- The specified time period has elapsed.

MONITOR STRATEGY

Related DTCs	P2773: Transfer L4 detection switch/ON malfunction
Required sensors/Components	Transfer L4 detection switch
Frequency of operation	Continuous
Duration	1.8 seconds
MIL operation	1 driving cycle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ON Malfunction:

The monitor will run whenever the following DTCs are not stored	None

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Vehicle speed sensor circuit fail (P0500)	Not detected
Output speed sensor circuit fail (P0722, P077C, P077D)	Not detected
L4 switch	ON
Output speed (Transfer output speed)	1000 to 3000 rpm

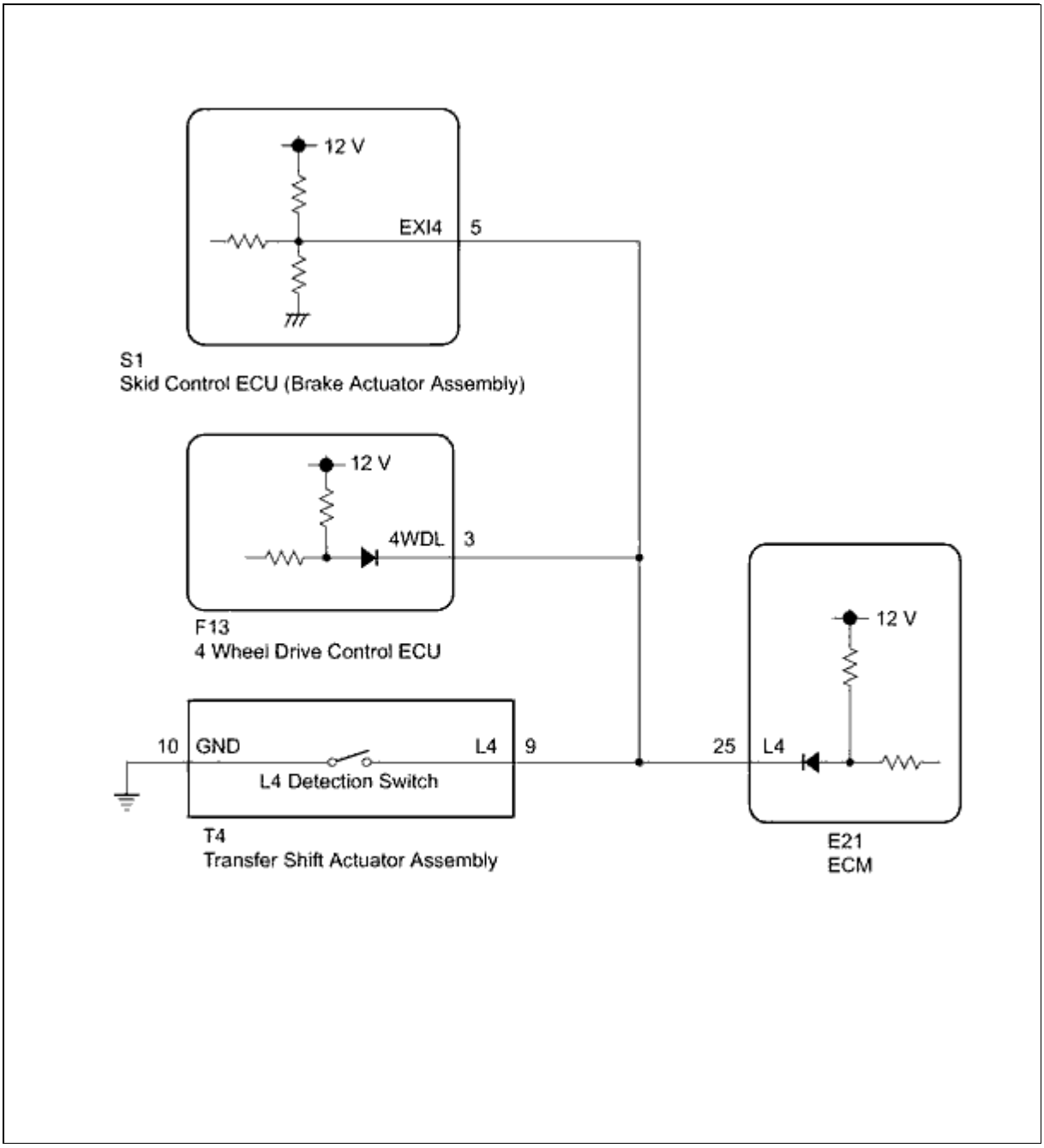
TYPICAL MALFUNCTION THRESHOLDS

ON Malfunction:

Actual transfer gear ratio Transfer input speed / Transfer output speed	0.9 to 1.1

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

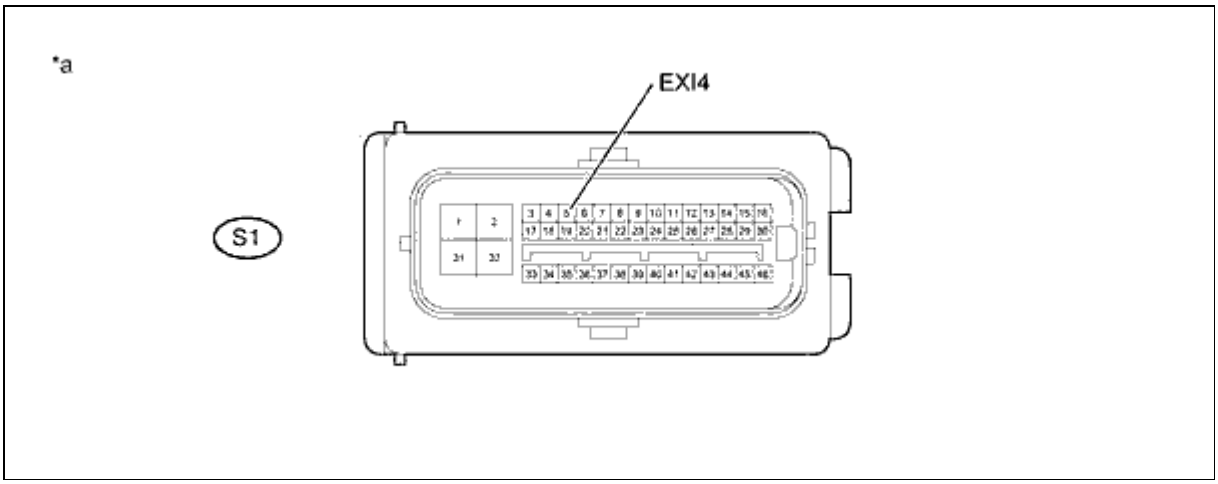
1. Turn the transfer position switch to 2WD.
2. Perform the D Position Shift Test in Road Test INFO .
3. Check for DTCs again INFO .

PROCEDURE

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1.	**CHECK SKID CONTROL ECU (BRAKE ACTUATOR ASSEMBLY)**

(a) Disconnect the skid control ECU (brake actuator assembly) connector.



Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Brake Actuator Assembly))	-	-

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
S1-5 (EXI4) - Body ground	Transfer position switch not 4L	10 kΩ or higher

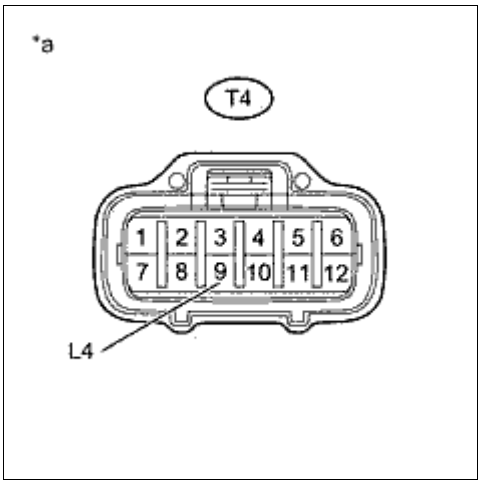
NG ▶ **GO TO STEP 2**

OK ▶ **GO TO BRAKE CONTROL SYSTEM**

2.	**CHECK TRANSFER SHIFT ACTUATOR ASSEMBLY**

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(a) Disconnect the transfer shift actuator assembly connector.



(b) Disconnect the S1 skid control ECU (brake actuator assembly) connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T4-9 (L4) - Body ground	Transfer position switch not 4L	10 kΩ or higher

Text in Illustration

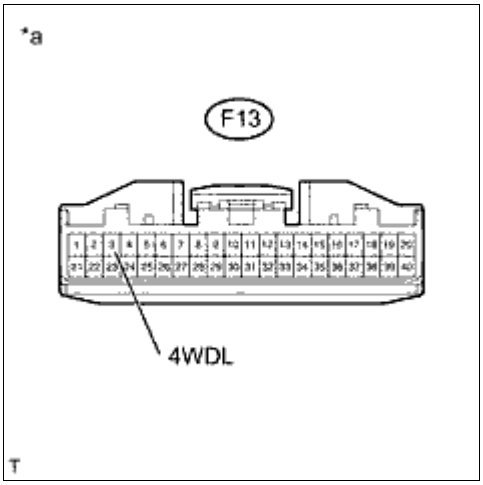
*a	Front view of wire harness connector (to Transfer Shift Actuator Assembly)

NG ▶ **GO TO STEP 3**

OK ▶ **GO TO TOUCH SELECT 2-4 AND HIGH-LOW SYSTEM**

3.	**CHECK 4 WHEEL DRIVE CONTROL ECU**

(a) Disconnect the 4 wheel drive control ECU connector.



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(b) Disconnect the T4 transfer shift actuator assembly connector.

(c) Disconnect the S1 skid control ECU (brake actuator assembly) connector.

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
F13-3 (4WDL) - Body ground	Transfer position switch not 4L	10 kΩ or higher

Text in Illustration

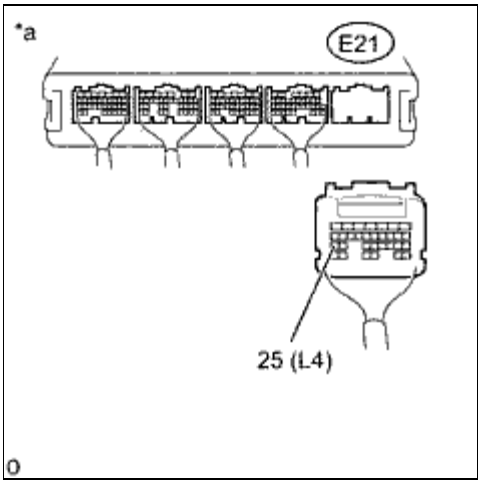
*a	Front view of wire harness connector (to 4 Wheel Drive Control ECU)

NG ▶ **GO TO STEP 4**

OK ▶ **GO TO TOUCH SELECT 2-4 AND HIGH-LOW SYSTEM**

4.	**CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU, TRANSFER SHIFT ACTUATOR ASSEMBLY, 4 WHEEL DRIVE CONTROL ECU - ECM)**

(a) Disconnect the ECM connector.



(b) Disconnect the F13 4 wheel drive control ECU connector.

(c) Disconnect the T4 transfer shift actuator assembly connector.

(d) Disconnect the S1 skid control ECU (brake actuator assembly) connector.

(e) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
E21-25 (L4) - Body ground	Transfer position switch not 4L	10 kΩ or higher

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Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000002IR0058X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2774; Four Wheel Drive (4WD) Low Switch Circuit High; 2016 MY Tacoma [08/2015 -]		

DTC	**P2774**	**Four Wheel Drive (4WD) Low Switch Circuit High**

DESCRIPTION

Refer to the system description for DTC P2773 INFO .

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
P2774	Transfer L4 detection switch remains off while the vehicle is being driven under the following conditions for 1.8 seconds or more (1 trip detection logic): (a) Output shaft speed is between 1000 and 3000 rpm. (b) Transfer position switch is in 4L.	• Open in transfer L4 detection switch circuit • Transfer system • ECM

MONITOR DESCRIPTION

The ECM monitors the L4 detection switch to determine when the transfer case L4 gears are engaged. If the transfer case 4H gears remain engaged under the following conditions, the ECM will conclude that there is a malfunction of the L4 detection switch, illuminate the MIL and store the DTC:

- The L4 detection switch indicates that the 4H transfer case gears are engaged.
- The transfer position switch is in 4L.
- The transfer case output shaft speed is between 1000 and 3000 rpm.
- The specified time period has elapsed.

MONITOR STRATEGY

Related DTCs	P2774: Transfer L4 detection switch/OFF malfunction
Required sensors/Components	Transfer L4 detection switch
Frequency of operation	Continuous
Duration	1.8 seconds
MIL operation	1 driving cycle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

OFF Malfunction:

The monitor will run whenever the following DTCs are not stored	None
Vehicle speed sensor circuit fail (P0500)	Not detected

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Output speed sensor circuit fail (P0722, P077C, P077D)	Not detected
L4 switch	OFF
Output speed (Transfer output speed)	1000 to 3000 rpm

TYPICAL MALFUNCTION THRESHOLDS

OFF Malfunction:

Actual transfer gear ratio Transfer input speed / Transfer output speed	2.3 to 2.83

WIRING DIAGRAM

Refer to DTC P2773 INFO

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the transfer position switch to 4L.
2. Drive the vehicle at 15 to 20 km/h (9 to 12 mph) for 1.8 seconds or more.
3. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK HARNESS AND CONNECTOR (ECM - TRANSFER SHIFT ACTUATOR ASSEMBLY)**

(a) Disconnect the E21 ECM connector.

(b) Disconnect the T4 transfer shift actuator assembly connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E21-25 (L4) - T4-9 (L4)	Always	Below 1 Ω

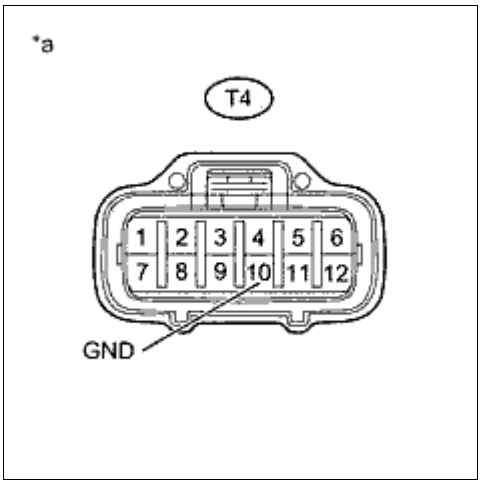
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

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2.	**CHECK HARNESS AND CONNECTOR (TRANSFER SHIFT ACTUATOR ASSEMBLY - BODY GROUND)**

(a) Disconnect the transfer shift actuator assembly connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T4-10 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Transfer Shift Actuator Assembly)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

3.	**INSPECT TRANSFER SHIFT ACTUATOR ASSEMBLY**

(a) Inspect the transfer shift actuator assembly.

INFO .

NG ▶ **REPLACE TRANSFER SHIFT ACTUATOR ASSEMBLY**

OK ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VQ05RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2808; Pressure Control Solenoid "G" Performance (Shift Solenoid Valve SL4); 2016 MY Tacoma [08/2015 -]		

DTC	**P2808**	**Pressure Control Solenoid "G" Performance (Shift Solenoid Valve SL4)**

SYSTEM DESCRIPTION

The ECM uses the vehicle speed signal and signals from the transmission revolution sensors (NT, SP2) to detect the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear).

The ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, transmission valve body assembly or automatic transmission assembly (clutch, brake or gear etc.).

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2808	Either condition is met (2 trip detection logic): • The engine revs freely when a shift to 3rd or 5th gear is commanded. • The condition that 4th gear is engaged when a shift to 4th gear is commanded occurs twice, and one of the following conditions is met: ○ When a shift to 1st gear is commanded, 3rd gear is engaged. ○ When a shift to 2nd gear is commanded, 3rd gear is engaged. ○ When a shift to 6th gear is commanded, 5th gear is engaged.	• Shift solenoid valve SL4 remains open or closed • Transmission valve body assembly is blocked • Automatic transmission assembly (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves on and off. According to the input turbine speed and output shaft speed, the ECM detects the actual gear (1st, 2nd, 3rd, 4th, 5th or 6th gear). When the gear commanded by the ECM and the actual gear are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P2808: Shift solenoid valve SL4/OFF malfunction Shift solenoid valve SL4/ON malfunction
Required sensors/Components	Shift solenoid valve SL4, Transmission revolution sensor (NT), Transmission revolution sensor (SP2), Crankshaft position sensor (NE)
Frequency of operation	Continuous

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Duration	OFF malfunction (A) and (B): 0.5 sec. OFF malfunction (C): 0.8 sec. ON malfunction: 0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever the following DTCs are not stored	P0712, P0713 (TFT (ATF temperature) sensor circuit P0115, P0117, P0118 (ECT (Engine coolant temperature) sensor circuit) P0717, P07BF, P07C0 (Turbine speed sensor circuit) P0722, P077C, P077D (Output sensor circuit) P0335 (Crankshaft position sensor circuit (This condition applies only if using fail-safe)) P0748 (Shift solenoid valve SL1 circuit) P0778 (Shift solenoid valve SL2 circuit) P0798 (Shift solenoid valve SL3 circuit) P2810 (Shift solenoid valve SL4 circuit) P0327, P0328, P0332, P0333 (KCS (Knock control sensor) circuit) P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P060A, P060B, P060D, P060E, P0657, P1607, P2102, P2103, P2111, P2112, P2118, P2119, P2135 (ETCS (Electronic throttle control system)) U0100 (CAN communication system)
TFT (ATF temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SL3 circuit	Not circuit malfunction
Shift solenoid valve SL4 circuit	Not circuit malfunction
KCS (Knock control sensor) circuit	Not circuit malfunction
ETCS (Electronic throttle control system)	Not system down
CAN communication system	Not system down
Transmission range	"D"
Duration time from shifting "N" to "D"	4 sec. or more
TFT (ATF temperature)	-10°C (14°F) or higher

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Engine	Running
Transfer position	HIGH*

HINT:

*: Following conditions are met

Vehicle speed sensor "A" circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
Transfer input speed / Transfer output speed (NO / NOtf)	0.9 or more, and less than 1.1

OFF malfunction (A):

ECM select gear	3rd
ECM indicated pressure value of SL1	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL2	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL4	1600 kPa (12.2 kgf/cm ^{2} , 174 psi)
Throttle valve opening angle	3% or more

OFF malfunction (B):

ECM select gear	5th
ECM indicated pressure value of SL1	0.1 kPa (0 kgf/cm ^{2} , 0 psi)
ECM indicated pressure value of SL2	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
ECM indicated pressure value of SL4	1600 kPa (16.3 kgf/cm ^{2} , 232 psi)
Throttle valve opening angle	3% or more

OFF malfunction (C):

ECM select gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed of 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (A):

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ECM select gear	1st
Time after transition to 1st gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) to 40 km/h (24.9 mph)
Engine speed - Turbine speed	50 rpm or more
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (B):

ECM select gear	2nd
Time after transition to 2nd gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (C):

ECM select gear	6th
Time after transition to 6th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1

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Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

ON malfunction (D):

ECM select gear	4th
Time after transition to 4th gear	0.1 sec. or more
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	11.7% or more at engine speed 3000 rpm (Condition varies with engine speed)
ECT (Engine coolant temperature)	40°C (104°F) or higher
Turbine speed / Output speed (NT / NO) in 1st gear	3.35 to 7.3
Turbine speed / Output speed (NT / NO) in 2nd gear	1.95 to 2.4
Turbine speed / Output speed (NT / NO) in 3rd gear	1.3 to 1.65
Turbine speed / Output speed (NT / NO) in 4th gear	0.9 to 1.1
Turbine speed / Output speed (NT / NO) in 5th gear	0.6376 to 0.7376
Turbine speed / Output speed (NT / NO) in 6th gear	0.5306 to 0.6306

TYPICAL MALFUNCTION THRESHOLDS

[OFF malfunction]

One of the following conditions is met: OFF malfunction (A), (B) or (C)

OFF malfunction (A):

Turbine speed - Output speed x 3rd gear ratio	1000 rpm or more

OFF malfunction (B):

Turbine speed - Output speed x 5th gear ratio	1000 rpm or more

OFF malfunction (C):

Turbine speed / Output speed when output speed less than 1000 rpm	3.35 to 7.3

[ON malfunction]

One of the following conditions are met: ON malfunction (A), (B) or (C) and ON malfunction (D) 2 detections are necessary per driving cycle:
1st detection: temporary flag ON
2nd detection: pending fault code ON

ON malfunction (A) and (B):

Turbine speed / Output speed when output speed less than 1000 rpm	1.3 to 1.65

ON malfunction (C):

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Turbine speed / Output speed when output speed less than 1000 rpm	0.6376 to 0.7376

ON malfunction (D):

Turbine speed / Output speed when output speed less than 1000 rpm	0.9 to 1.1

INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Perform the D Position Shift Test in Road Test INFO .*1
2. Turn the ignition switch off.
3. Perform step (*1) again.
4. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P2808)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.

(e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only DTC P2808 is output	A
P2808 and other DTCs are output	B

HINT:

If a solenoid is stuck off, DTCs for several solenoids including the malfunctioning solenoid will be detected.

A ▶ **GO TO STEP 3**

B ▼

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2.	PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE SHIFT POSITION)

NOTICE:

This test should always be performed with at least 2 people.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Active Test.

(g) According to the display on the Techstream, perform the Active Test.

HINT:

Comparing the gear commanded by the Active Test with the actual gear enables confirmation of the problem INFO .

Engine and ECT

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Shift Position	Operates the shift solenoid valves to allow gears to be selected manually.	• Press "→" button: Up-shift occurs • Press "←" button: Down-shift occurs	Can be used to check the operation of the shift solenoid valves. Up-shifts and down-shifts should be performed consecutively. A 10 second interval is required between gear changes. Do not down-shift at high speeds. Doing so will damage the automatic transmission. [Vehicle Condition] 50 km/h (31 mph) or less

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th and 5th to 6th up-shift must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shift must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The gear commanded by the ECM is shown in the Data List / Shift Status display on the Techstream.

(h) Compare the ECM commanded gear and the actual gear.

Result

ACTUAL GEAR DURING MALFUNCTION	ECM COMMANDED GEAR						PROCEED TO
	1ST	2ND	3RD	4TH	5TH	6TH	

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ACTUAL GEAR DURING MALFUNCTION		ECM COMMANDED GEAR						PROCEED TO
		1ST	2ND	3RD	4TH	5TH	6TH	
Shift solenoid valve SL1	Stuck ON	1st	2nd	3rd	4th	4th	4th	A
	Stuck OFF	N*1	N*1	N*1	N*1	5th	6th	
Shift solenoid valve SL2	Stuck ON	4th	4th	4th	4th	5th	6th	B
	Stuck OFF	1st	2nd	3rd	1st	N*1	N*1	
Shift solenoid valve SL3	Stuck ON	2nd	2nd	3rd	4th	5th	6th	C
	Stuck OFF	1st	1st	3rd	4th	5th	N*1	
Shift solenoid valve SL4	Stuck ON	3rd	3rd	3rd	4th	5th	5th	D
	Stuck OFF	1st	2nd	1st	4th	N*1	6th	
Shift solenoid valve SLT	Stuck ON	N*2	N*2	N*2	N*2	N*2	N*2	E
	Stuck OFF*3	1st	2nd	3rd	4th	5th	6th	

HINT:

- *1: Neutral
- *2: If shift solenoid valve SLT is stuck on, the line pressure will be low. Therefore, the amount of torque that can be transmitted by each gear is lower than the normal limit. When the engine power exceeds this lowered limit, the engine speed will increase freely.
- *3: When shift solenoid valve SLT is stuck off, gear shifting is normal.

B ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL2 PERFORMANCE DTC P0776)**

C ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL3 PERFORMANCE DTC P0796)**

D ▶ **GO TO STEP 3**

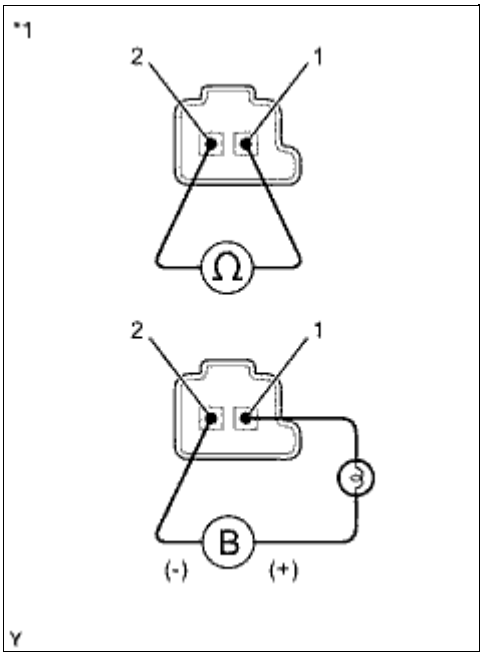
E ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SLT PERFORMANCE DTC P2714)**

A ▶ **GO TO DTC CHART (RELATED SHIFT SOLENOID VALVE SL1 PERFORMANCE DTC P0746)**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

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(a) Remove shift solenoid valve SL4 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

NG ▶ **REPLACE SHIFT SOLENOID VALVE SL4**

OK ▼

4.	**INSPECT TRANSMISSION VALVE BODY ASSEMBLY**

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(a) Check the transmission valve body assembly INFO .

OK:

There is no foreign matter on each valve and they operate smoothly.

NG ▶ **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK ▶ **REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSEMBLY**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM0000026VR05KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): P2810; Pressure Control Solenoid "G" Electrical (Shift Solenoid Valve SL4); 2016 MY Tacoma [08/2015 -]		

DTC	**P2810**	**Pressure Control Solenoid "G" Electrical (Shift Solenoid Valve SL4)**

DESCRIPTION

Changing from 1st to 6th is performed by the ECM turning shift solenoid valves SL1, SL2, SL3 and SL4 on and off. If an open or short circuit occurs in any of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated INFO

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P2810	An open or short circuit (output signal duty is 0% or 100%) is detected by the ECM in the shift solenoid valve SL4 circuit while driving and shifting gears (SL4 output signal duty is more than 0% and less than 100% under normal conditions) (1 trip detection logic).	• Open or short in shift solenoid valve SL4 circuit • Shift solenoid valve SL4 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL4 circuit. The ECM commands gear shifts by turning the shift solenoid valves on or off. When there is an open or short circuit in any of the shift solenoid valve circuits, the ECM detects the problem and illuminates the MIL and stores the DTC. The ECM also performs the fail-safe function and turns the other normal shift solenoid valves on or off. (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL4 circuit, the ECM determines there is a malfunction INFO .

MONITOR STRATEGY

Related DTCs	P2810: Shift solenoid valve SL4/Range check
Required sensors/Components	Shift solenoid valve SL4
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediately
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

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The monitor will run whenever the following DTCs are not stored	None
Ignition switch	ON
Starter	OFF

Condition (A):

Battery voltage	12 V or higher

Condition (B):

Battery voltage	10 V or higher, and below 12 V
Target current	Below 0.75 A

Condition (C):

Battery voltage	8 V or higher
Target current	0.25 A or higher

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A), (B) or (C)

Condition (A) and (B):

Output duty cycle	100% or more

Condition (C):

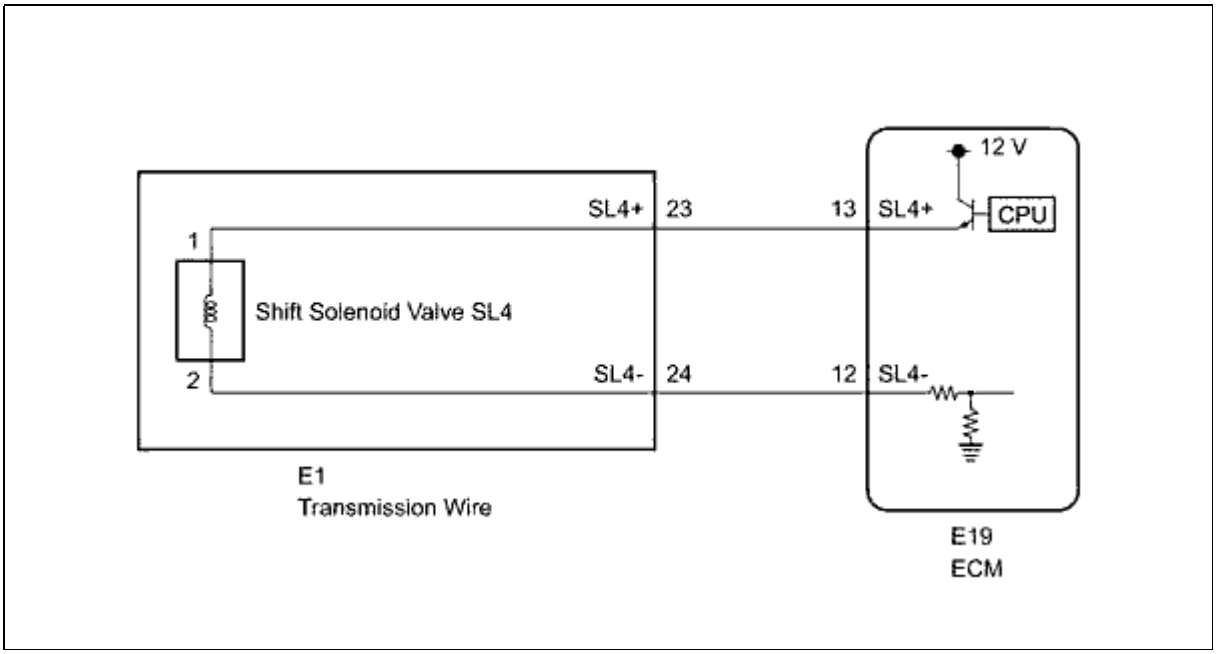
Output duty cycle	0% or less

COMPONENT OPERATING RANGE

Output duty cycle	More than 0%, and less than 100%

WIRING DIAGRAM

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INSPECTION PROCEDURE

NOTICE:

- Perform the universal trip to clear permanent DTCs INFO .
- Perform registration and/or initialization when parts related to the automatic transmission are replaced INFO .

HINT:

- The following table shows normal operation of the shift solenoid valve SL4 when the shift lever is in D:

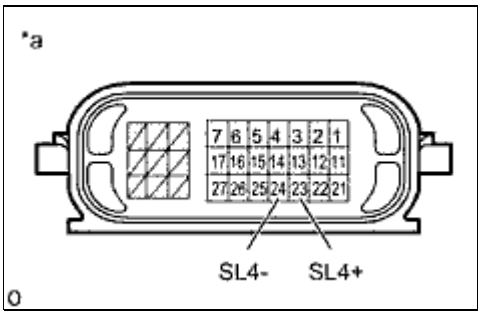
ECM commanded gear	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve SL4	OFF	OFF	ON	OFF	ON	OFF

- After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.
  a. Perform the D Position Shift Test in Road Test INFO .
  b. Check for DTCs again INFO .

PROCEDURE

1.	**INSPECT TRANSMISSION WIRE (SHIFT SOLENOID VALVE SL4)**

(a) Disconnect the E1 transmission wire connector.



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(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
23 (SL4+) - 24 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
23 (SL4+) - Body ground	Always	10 kΩ or higher
24 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

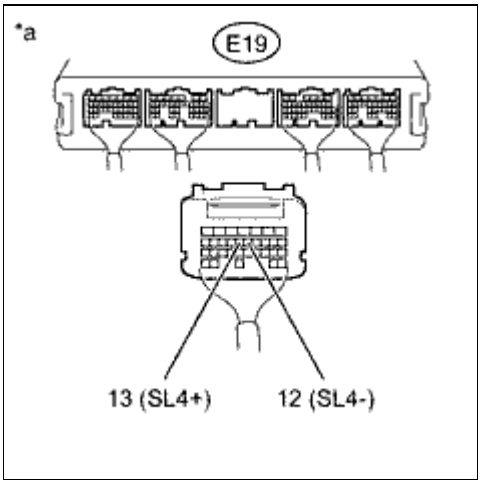
*a	Component without harness connected (Transmission Wire)

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-13 (SL4+) - E19-12 (SL4-)	20°C (68°F)	5.0 to 5.6 Ω
E19-13 (SL4+) - Body ground	Always	10 kΩ or higher
E19-12 (SL4-) - Body ground	Always	10 kΩ or higher

Text in Illustration

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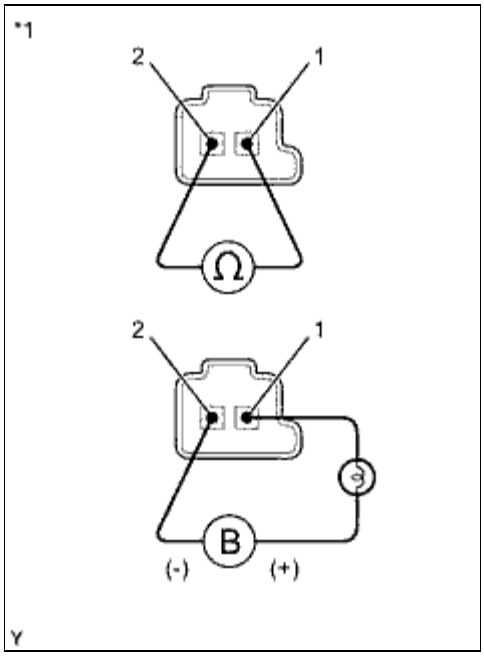
*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **REPLACE ECM**

3.	**INSPECT SHIFT SOLENOID VALVE SL4**

(a) Remove shift solenoid valve SL4 INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

(c) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

Text in Illustration

*1	Shift Solenoid Valve SL4

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NG ▶ REPLACE SHIFT SOLENOID VALVE SL4

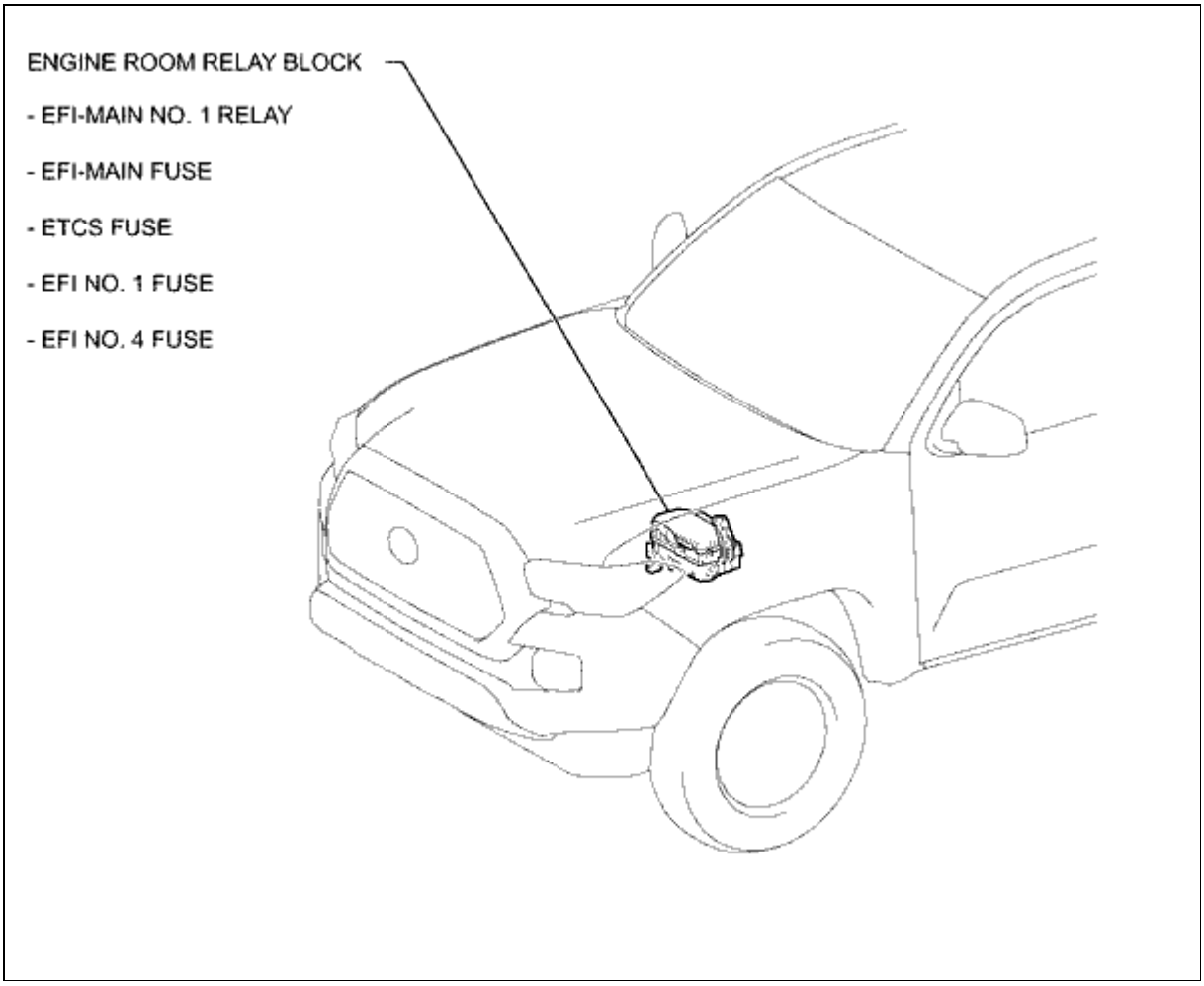
OK ▶ REPLACE TRANSMISSION WIRE

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Last Modified: 11-13-2015	6.6 R	**Doc ID:** RM000000W720LFX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): PARTS LOCATION; 2016 MY Tacoma [08/2015 -]		

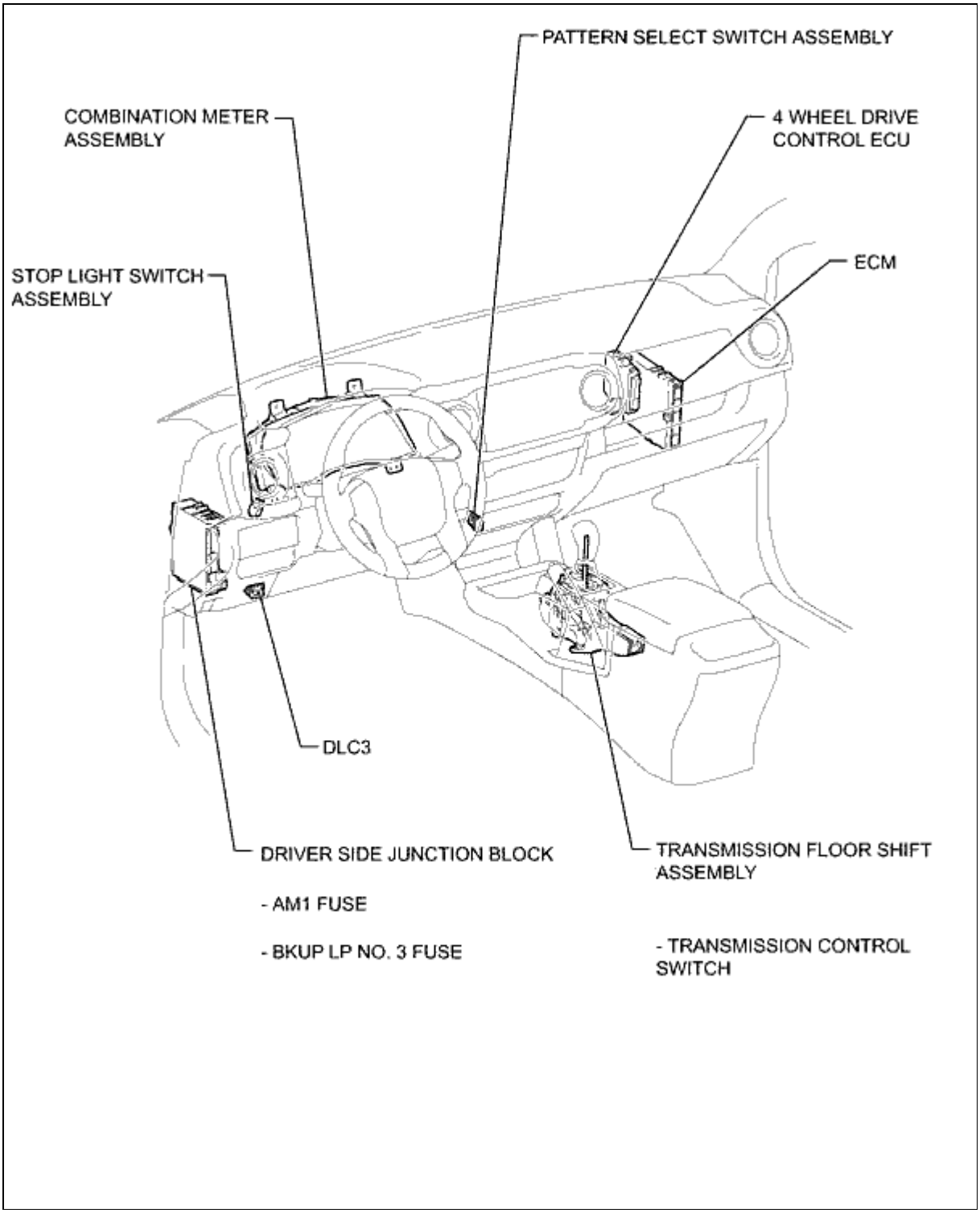
PARTS LOCATION

ILLUSTRATION



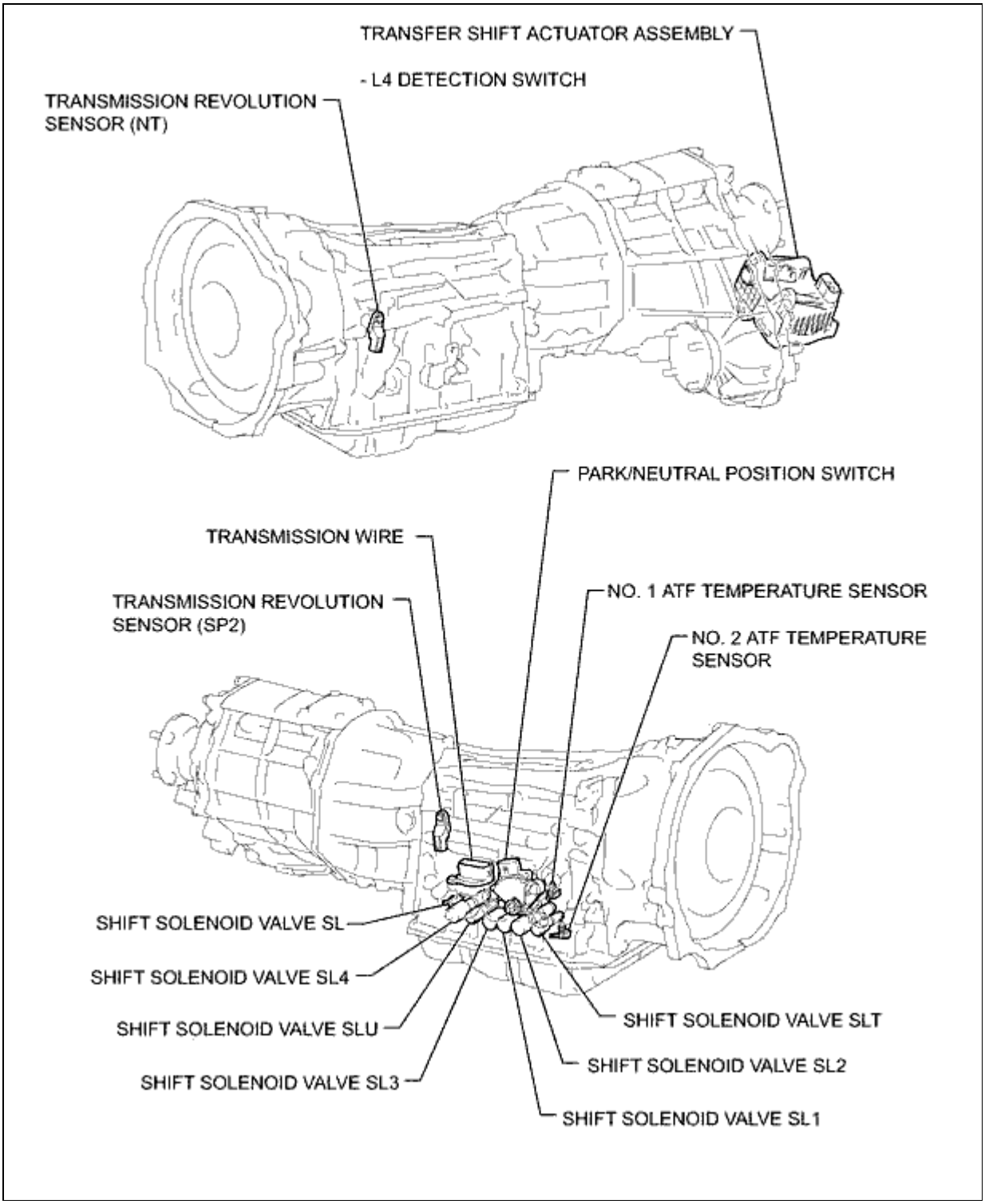
ILLUSTRATION

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ILLUSTRATION

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Last Modified: 11-13-2015	6.6 L	**Doc ID:** RM000000O7H0IFX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): PRECAUTION; 2016 MY Tacoma [08/2015 -]		

PRECAUTION

1. PRECAUTION

NOTICE:

- When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected INFO .
- Perform the Reset Memory procedures (A/T initialization) after replacing the automatic transmission assembly, transmission valve body assembly or any of the shift solenoid valves INFO .

HINT:

Reset Memory cannot be completed by only reconnecting the cable to the negative (-) battery terminal.

- If either of the following conditions is met, perform ATF Thermal Degradation Estimate Reset INFO .
  - The ATF has been replaced.

HINT:

If 50000 or more is displayed for the Data List item "ATF Thermal Degradation Estimate", thermal degradation of the ATF is suspected. Perform ATF Thermal Degradation Estimate Reset after replacing the ATF.

  - Approximately 50% or more of the ATF has been replaced during a repair of the transmission or a similar operation.
- Perform Registration (VIN registration) when replacing the ECM INFO .

CAUTION:

When using compressed air, always aim away from yourself to prevent Automatic Transmission Fluid (ATF) or kerosene from spraying on your face.

NOTICE:

- The automatic transmission is composed of precision-made parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect performance.
- The procedures are organized so that you work on only one component group at a time. This will help avoid confusion with similar-looking parts of different sub-assemblies being on your workbench at the same time.
- The component groups are inspected and repaired from the converter housing side.
- Whenever possible, complete the inspection, repair and reassembly before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.
- Use of Toyota Genuine ATF WS is recommended.
- All disassembled parts should be washed clean, and compressed air should be blown through any fluid passages and holes.
- Dry all parts with compressed air. Never use cloth.
- The recommended ATF or kerosene should be used for cleaning.
- After cleaning, the parts should be arranged in the order they were removed for efficient inspection, repairs and reassembly.
- New discs for the brakes and clutches that will be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
- All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF

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prior to reassembly.

- All old gaskets and rubber O-rings must be replaced.
- Do not apply adhesive cement to gaskets and similar parts.
- Make sure that the ends of the snap rings are not aligned with any cutouts. Also make sure that snap rings are correctly installed into the grooves.
- If a worn bushing is to be replaced, the sub-assembly containing the bushing must also be replaced.
- Check the thrust bearings and races for wear or damage. Replace them if necessary.
- Use petroleum jelly to keep parts in place.
- When working with seal packing material, the following must be observed:
    - Using a razor blade and a gasket scraper, remove all the old seal packing material from the gasket surface.
    - Thoroughly clean all components to remove any loose material.
    - Clean both sealing surfaces with a non-residue solvent.
    - Parts must be reassembled within 10 minutes of application. Otherwise, the seal packing material must be removed and reapplied.





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Last Modified: 11-13-2015	6.6 T	**Doc ID:** RM000000W73149X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): PROBLEM SYMPTOMS TABLE; 2016 MY Tacoma [08/2015 -]		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- The Matrix Chart is divided into 2 chapters. When troubleshooting, check Chapter 1 first. If instructions are given in Chapter 1 to proceed to 2, proceed as instructed.
- If the instruction "Proceed to Next Suspected Area Shown in Problem Symptoms Table" is given in the flowchart for each circuit, proceed to the next suspected area in the table.
- If the problem still occurs even though there are no malfunctions in any of the circuits, check the ECM and replace it if necessary.
- *: When the circuit is defective, a DTC may be output.

1. Chapter 1: Electronic Circuit Matrix Chart

SYMPTOM	SUSPECTED AREA	SEE PAGE
No up-shift (1st to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No up-shift (2nd to 3rd)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No up-shift (3rd to 4th)	Shift solenoid valve SL2 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (4th to 5th)	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No up-shift (5th to 6th)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
No down-shift (6th to 5th)	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
No down-shift (5th to 4th)	Shift solenoid valve SL1 circuit*	INFO
	ECM	INFO
No down-shift (4th to 3rd)	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (3rd to 2nd)	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	ECM	INFO
No down-shift (2nd to 1st)	Shift solenoid valve SL3 circuit*	INFO
	ECM	INFO
No lock-up or no lock-up off	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	Stop light switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO
	ECM	INFO
Shift point too high or too low	Throttle position sensor circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	Park/neutral position switch circuit*	INFO
	No. 1 ATF temperature sensor circuit*	INFO
	Pattern select switch power mode circuit*	INFO
	ECM	INFO
No gear change by moving shift lever to "+" or "-" while in S	Transmission control switch circuit	INFO
	ECM	INFO
Harsh engagement (N to D)	Shift solenoid valve SLT circuit*	INFO
	ECM	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Harsh engagement (Any driving position)	Throttle position sensor circuit*	INFO
	Shift solenoid valve SL1 circuit*	INFO
	Shift solenoid valve SL2 circuit*	INFO
	Shift solenoid valve SL3 circuit*	INFO
	Shift solenoid valve SL4 circuit*	INFO
	Shift solenoid valve SLT circuit*	INFO
	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO
	ECM	INFO
Harsh engagement (Lock-up)	Shift solenoid valve SLU circuit*	INFO
	Shift solenoid valve SL circuit*	INFO
	Transmission revolution sensor (NT) circuit*	INFO
	Transmission revolution sensor (SP2) circuit*	INFO
	ECM	INFO
Poor acceleration	Shift solenoid valve SLT circuit*	INFO
	No. 2 ATF temperature sensor circuit*	INFO
	ECM	INFO
Shifting malfunction (Vehicle is stuck in 3rd or 5th gear)	ECM power source circuit	INFO
Changing gears takes time when up-shifting	Shift solenoid valve SL circuit*	INFO
No engine braking	ECM	INFO
No kick-down	ECM	INFO
Slip or shudder (5th to 6th and 6th to 5th)	Shift solenoid valve SL circuit*	INFO
ATF temperature warning indicator remains on	No. 2 ATF temperature sensor circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
Lock-up in 3rd gear	No. 2 ATF temperature sensor circuit*	INFO
	Engine coolant temperature sensor circuit*	INFO
	ECM	INFO
Vehicle moves forward with shift lever in N	Park/neutral position switch circuit*	INFO
	ECM	INFO
Engine stalls when starting off or stopping	Shift solenoid valve SLU circuit*	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	ECM	INFO
Shifting malfunction	Park/neutral position switch circuit*	INFO
	Transmission control switch circuit	INFO
	ECM	INFO

2. Chapter 2: On-Vehicle Repair and Off-Vehicle Repair

SYMPTOM	SUSPECTED AREA	SEE PAGE
Vehicle does not move when shift lever is in any forward position or reverse position	Transmission control cable	INFO
	Manual valve	INFO
	Parking lock pawl	INFO
	Rear planetary gear unit	INFO
	Torque converter assembly	INFO
Vehicle does not move with shift lever in R	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
No up-shift (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
No up-shift (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO
	Shift solenoid valve SL2*	INFO
No up-shift (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL1*	INFO
No up-shift (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
No down-shift (6th to 5th)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (5th to 4th)	Shift solenoid valve SL1*	INFO
	No. 1 clutch (C1)	INFO
	Valve body assembly	INFO
No down-shift (4th to 3rd)	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
	Shift solenoid valve SL2*	INFO
	Valve body assembly	INFO
No down-shift (3rd to 2nd)	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
	Shift solenoid valve SL4*	INFO
	Valve body assembly	INFO
No down-shift (2nd to 1st)	Valve body assembly	INFO
	Shift solenoid valve SL3*	INFO
No lock-up or No lock-up off	Valve body assembly	INFO
	Torque converter assembly	INFO
Harsh engagement (N to D)	Valve body assembly	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	Shift solenoid valve SL1*	INFO
Harsh engagement (Lock-up)	Valve body assembly	INFO
	Torque converter assembly	INFO
	Shift solenoid valve SLU*	INFO
Harsh engagement (N to R)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Harsh engagement (1st to 2nd to 3rd to 4th to 5th to 6th)	Valve body assembly	INFO
	Shift solenoid valve SLT*	INFO
Harsh engagement (1st to 2nd)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (2nd to 3rd)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (3rd to 4th)	Valve body assembly	INFO
	No. 2 clutch (C2)	INFO
	Shift solenoid valve SL2*	INFO
Harsh engagement (4th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Harsh engagement (5th to 6th)	Valve body assembly	INFO
	No. 1 brake (B1)	INFO
	Shift solenoid valve SL3*	INFO
Harsh engagement (6th to 5th)	Valve body assembly	INFO
	No. 3 brake (B3)	INFO
	Shift solenoid valve SL4*	INFO
Slip or shudder (forward and reverse, after warm-up)	Transmission control cable	INFO
	Valve body assembly	INFO
	Oil strainer	INFO
	No. 1 brake (B1)	INFO
	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
	Torque converter assembly	INFO
Slip or shudder (particular position, just after engine starts)	Torque converter assembly	INFO

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SYMPTOM	SUSPECTED AREA	SEE PAGE
Slip or shudder (shift lever in R)	No. 2 brake (B2)	INFO
	No. 3 brake (B3)	INFO
Slip or shudder (1st)	No. 3 one-way clutch (F3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (2nd)	No. 1 brake (B1)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (3rd)	No. 3 brake (B3)	INFO
	No. 1 clutch (C1)	INFO
Slip or shudder (4th)	No. 1 clutch (C1)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (5th)	No. 3 brake (B3)	INFO
	No. 2 clutch (C2)	INFO
Slip or shudder (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO
No engine braking (1st to 4th, shift lever in S)	No. 1 clutch (C1)	INFO
No engine braking (1st)	Valve body assembly	INFO
	No. 2 brake (B2)	INFO
	No. 1 clutch (C1)	INFO
No kick-down	Valve body assembly	INFO
Shift point too high or too low	Valve body assembly	INFO
Poor acceleration (All positions)	Valve body assembly	INFO
	Torque converter assembly	INFO
Poor acceleration (6th)	No. 1 brake (B1)	INFO
	No. 2 clutch (C2)	INFO
	Front planetary gear unit	INFO
Engine stalls when starting off or stopping	Valve body assembly	INFO
	Torque converter assembly	INFO

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Last Modified: 11-13-2015	6.6 J	**Doc ID:** RM0000031IU03FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): Pattern Select Switch Power Mode Circuit; 2016 MY Tacoma [08/2015 -]		

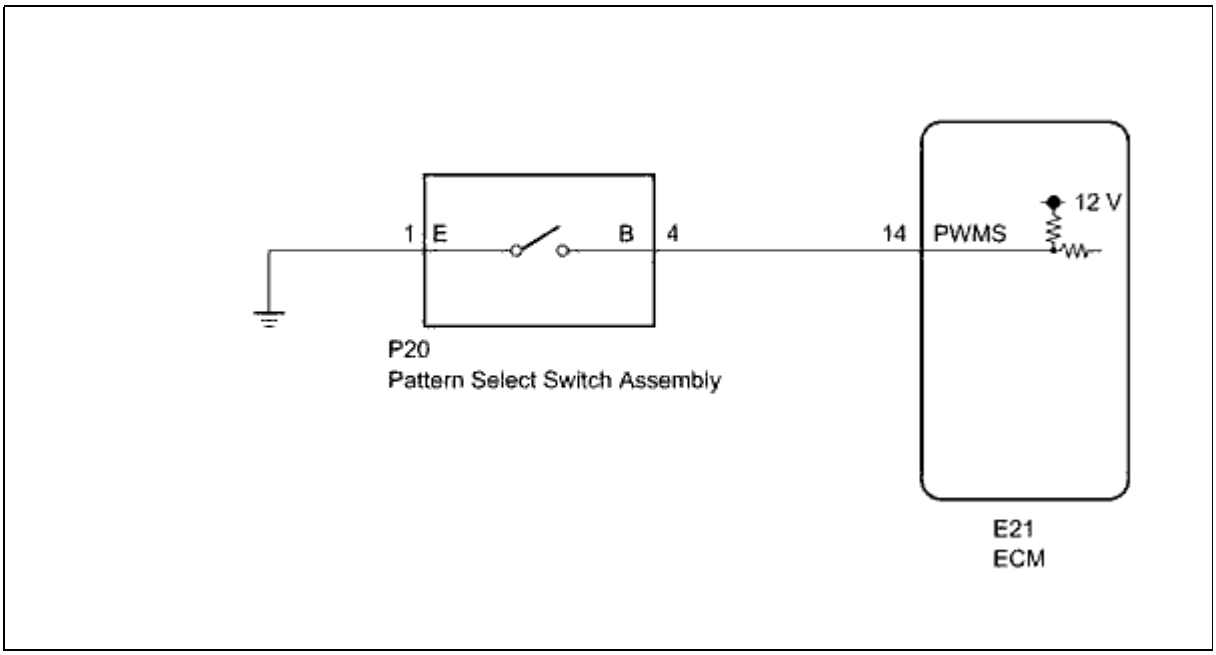
Pattern Select Switch Power Mode Circuit

DESCRIPTION

The ECM memory contains the programs for the normal and PWR shift patterns.

By following the programs corresponding to the signals from the pattern select switch assembly, park/neutral position switch and other various sensors, the ECM switches the shift solenoid valves on and off, and controls the transmission gear ratio.

WIRING DIAGRAM



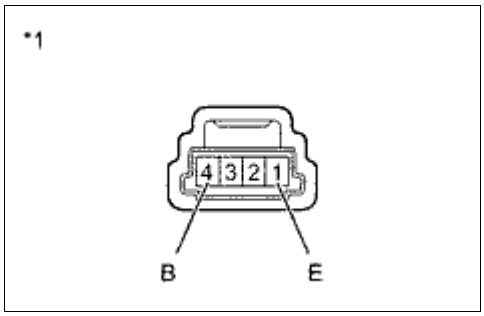
INSPECTION PROCEDURE

PROCEDURE

1.	**INSPECT PATTERN SELECT SWITCH ASSEMBLY**

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(a) Remove the pattern select switch assembly INFO .



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 (E) - 4 (B)	Pattern select switch assembly pushed	Below 1 Ω
1 (E) - 4 (B)	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

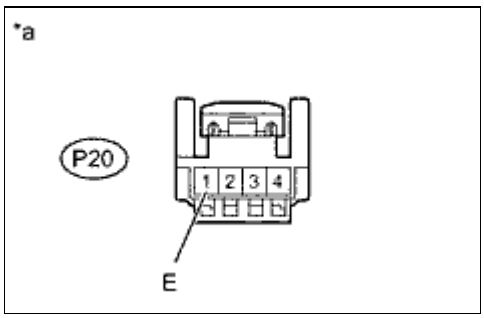
*1	Pattern Select Switch Assembly

NG ▶ **REPLACE PATTERN SELECT SWITCH ASSEMBLY**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - BODY GROUND)**

(a) Disconnect the pattern select switch assembly connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
P20-1 (E) - Body ground	Always	Below 1 Ω

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Text in Illustration

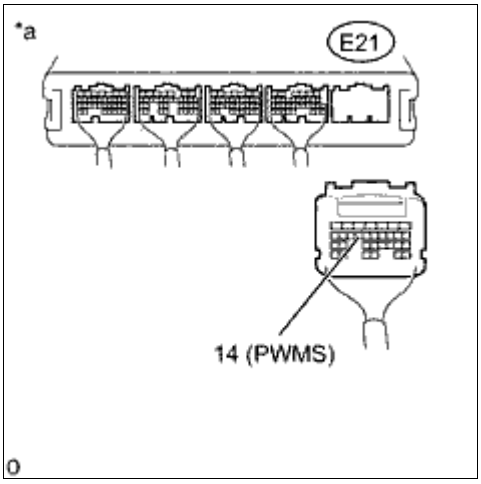
*a	Front view of wire harness connector (to Pattern Select Switch Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (PATTERN SELECT SWITCH ASSEMBLY - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
E21-14 (PWMS) - Body ground	Pattern select switch assembly pushed	Below 1 Ω
E21-14 (PWMS) - Body ground	Pattern select switch assembly not pushed	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W790T7X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): ROAD TEST; 2016 MY Tacoma [08/2015 -]		

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

(a) Based on the result of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transmission does not shift up or down, or that the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and attempt to duplicate the problem symptoms.

2. ROAD TEST

(a) Perform a road test.

CAUTION:

Check for safety before performing any tests.

NOTICE:

- Be sure to inspect and adjust the engine before performing these tests.
- Perform the road test with the engine coolant temperature is 70°C (158°F) or higher and the ATF temperature between 40 and 110°C (104 and 230°F).
- Perform these tests with the air conditioning and cruise control off.

INSPECTION	PROCEDURE
Transmission Control Switch Test	With the vehicle stationary and the shift lever in D, move the shift lever to S and return it to D. Check that the meter display changes from D to the appropriate S range and then back again.
S Position Test	With the vehicle stationary and the shift lever in S, move the shift lever to "+" and "-". Check that the meter display changes between S ranges properly.
D Position Shift Test	While driving the vehicle normally, check that the transmission shifts up and down through each gear properly.
Lock-up Function	While driving on a level surface at a constant speed in the lock-up range with the shift lever in D, lightly depress the accelerator pedal and check that the engine speed does not change abruptly.
P Position Test	Stop the vehicle on an incline (approximately 5° or more). Then move the shift lever to P and release the parking brake. Check that the parking lock pawl holds the vehicle in place.
Abnormal Noise and Vibration	Check for abnormal noise and vibration while driving the vehicle forward and backward, and during shift operations.
Fluid Leakage	After performing all other road test inspections, check for fluid leakage.

HINT:

When checking for DTCs after a repair, drive the vehicle according to the monitor drive pattern INFO .

(b) Shift schedule confirmation

(1) Connect the Techstream to the DLC3.

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(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Engine and ECT / Data List / Vehicle Speed, Accelerator Position and Shift Status.

(5) Check that the "Shift Status" changes in accordance with the "Vehicle Speed" as shown in the following table.

Shift Schedule Chart

ACCELERATOR POSITION	6%				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	5 to 15 km/h (3 to 9 mph)	20 to 25 km/h (12 to 16 mph)	30 to 40 km/h (18 to 25 mph)	50 to 60 km/h (31 to 37 mph)	60 to 70 km/h (37 to 44 mph)

NOTICE:

- All vehicle speeds indicated in the above table are actual values. Therefore, if checking a shift point with a chassis dynamometer, keep in mind that there is a margin of error in the chassis dynamometer indication.
- If checking a shift point against the vehicle speed indicated on the speedometer, remember to consider the speedometer correction rate and margin of error in the Techstream indication.

(c) Lock-up confirmation

(1) Connect the Techstream to the DLC3.

(2) Turn the ignition switch to ON.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Engine and ECT / Data List / Vehicle Speed, Engine Speed, Accelerator Position, SPD (NT), A/T Oil Temperature 1, Lock Up and Shift Status.

(5) When the following conditions are met, check that the difference between "Engine Speed" and "SPD (NT)" is 50 rpm or less.

Lock-up Schedule

Accelerator Position	6%
Vehicle Speed	80 km/h (50 mph) or more
Shift Status	6th gear
Lock Up	ON

HINT:

Lock-up prohibition conditions:

- A/T oil temperature is below 40°C (104°F)
- Engine coolant temperature is below 70°C (158°F)
- Shift range between "1" (S1 range) and "3" (S3 range)
- Accelerator pedal is fully released
- Stop light switch signal is on

(d) Manual down-shift permission speed

(1) Manual down-shift is permitted for each shift status when the vehicle speed is below the corresponding range shown in the following table.

Manual Down-shift Permission Speed Chart

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SHIFT STATUS (SHIFT LEVER IN S)	S6 TO S5	S5 TO S4	S4 TO S3	S3 TO S2	S2 TO S1
Vehicle Speed	240 to 255 km/h (149 to 158 mph)	165 to 180 km/h (103 to 112 mph)	110 to 120 km/h (68 to 75 mph)	70 to 80 km/h (43 to 50 mph)	35 to 40 km/h (22 to 25 mph)

(e) Shift schedule when accelerator pedal is fully depressed

Shift Schedule Chart

ACCELERATOR PEDAL	FULLY DEPRESSED				
SHIFT STATUS (SHIFT LEVER IN D)	1ST TO 2ND	2ND TO 3RD	3RD TO 4TH	4TH TO 5TH	5TH TO 6TH
Vehicle Speed	35 to 40 km/h (22 to 25 mph)	75 to 85 km/h (47 to 53 mph)	110 to 125 km/h (68 to 78 mph)	165 to 180 km/h (103 to 112 mph)	320 to 335 km/h (198 to 208 mph)

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000000W750TBX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): SYSTEM DESCRIPTION; 2016 MY Tacoma [08/2015 -]		

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The Electronic Controlled Automatic Transmission (ECT) is an automatic transmission that has its shift timing electronically controlled by the ECM. The ECM detects electrical signals that indicate engine and driving conditions, and controls the shift point, based on driver's habits and road conditions. As a result, fuel efficiency and transmission performance are improved.

Shift shock has been reduced by controlling the engine and transmission simultaneously.

In addition, the ECT has features such as:

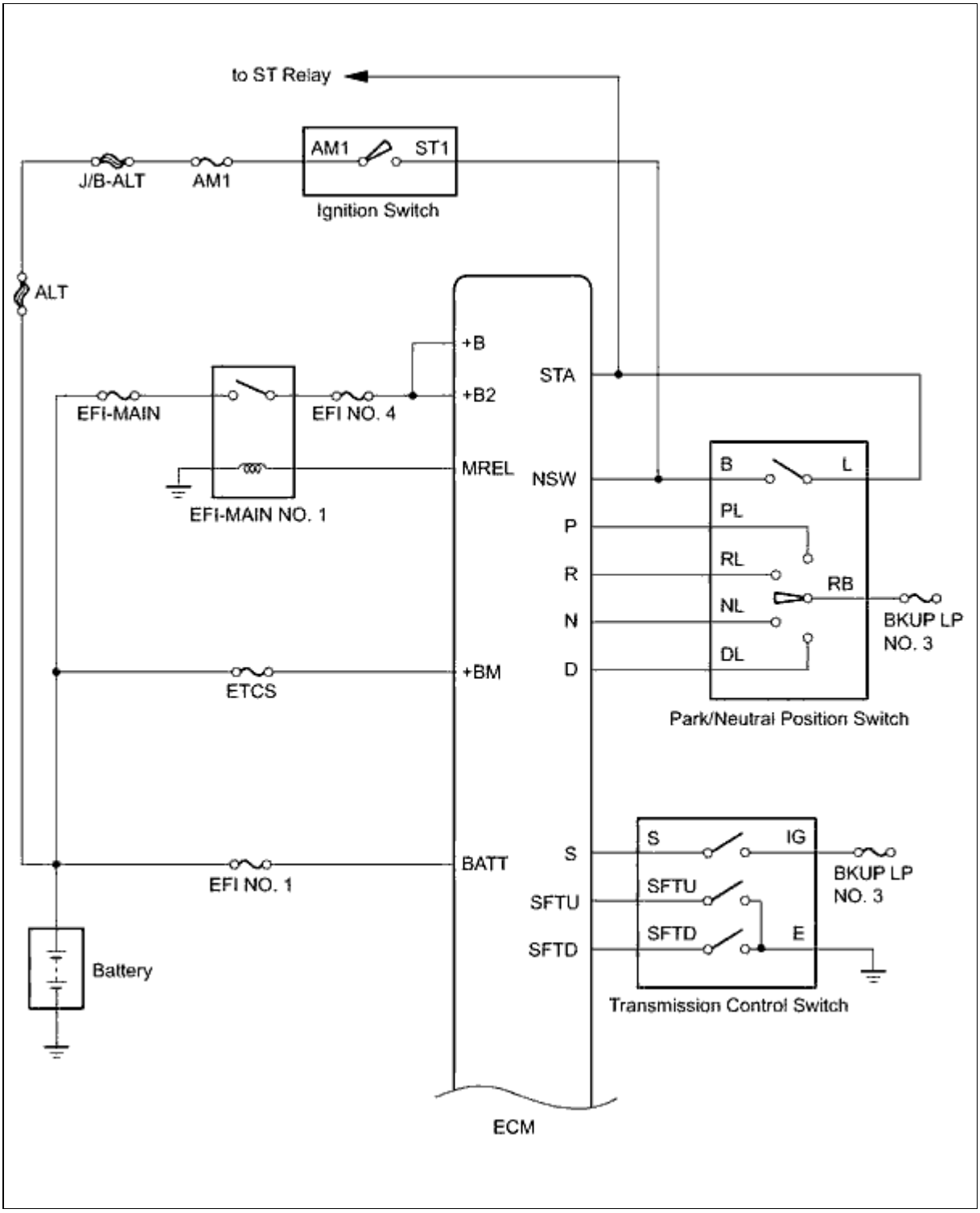
- Diagnostic function.
- Fail-safe function for use when a malfunction occurs.

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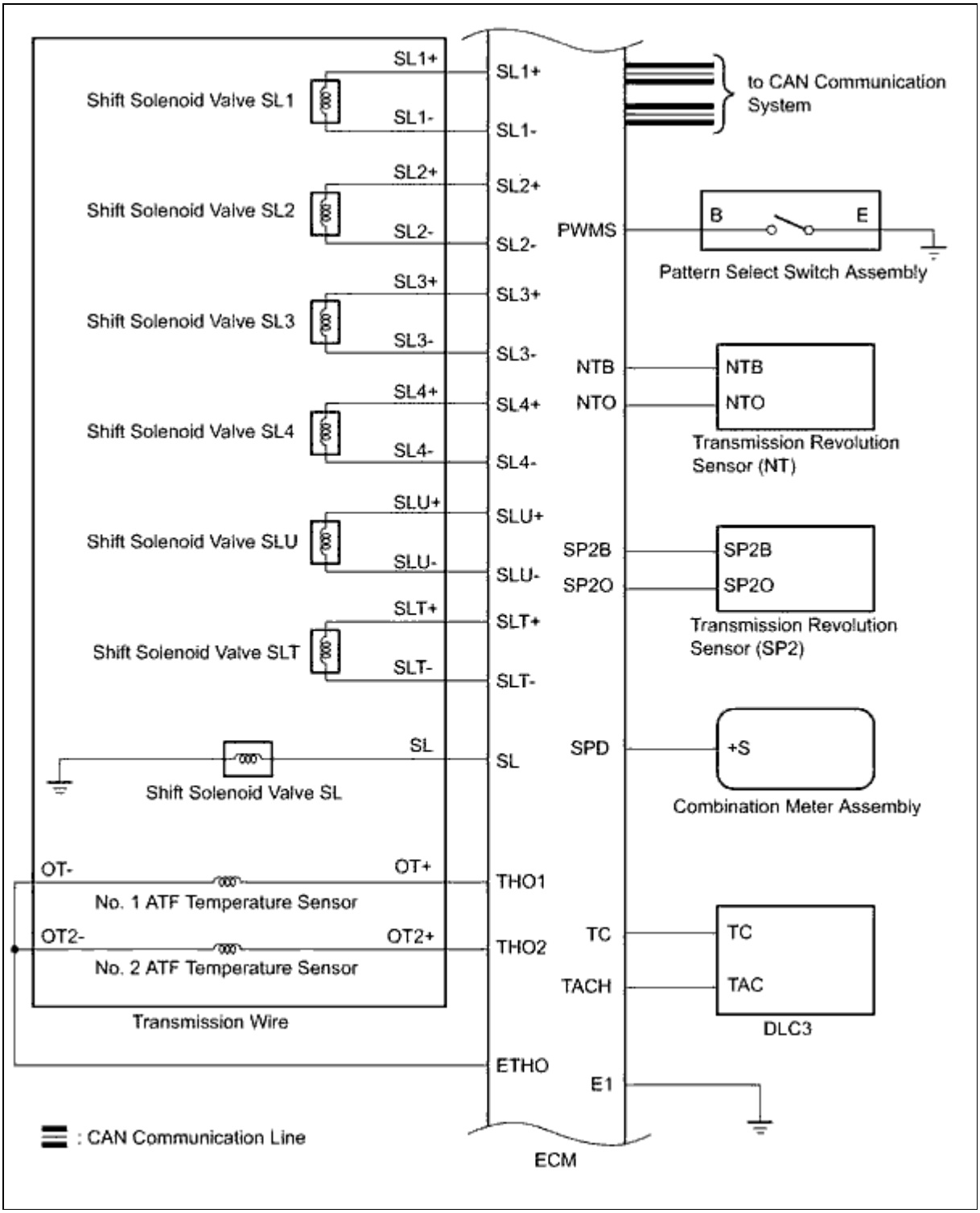
Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000000W7D0LQX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): SYSTEM DIAGRAM; 2016 MY Tacoma [08/2015 -]		

SYSTEM DIAGRAM

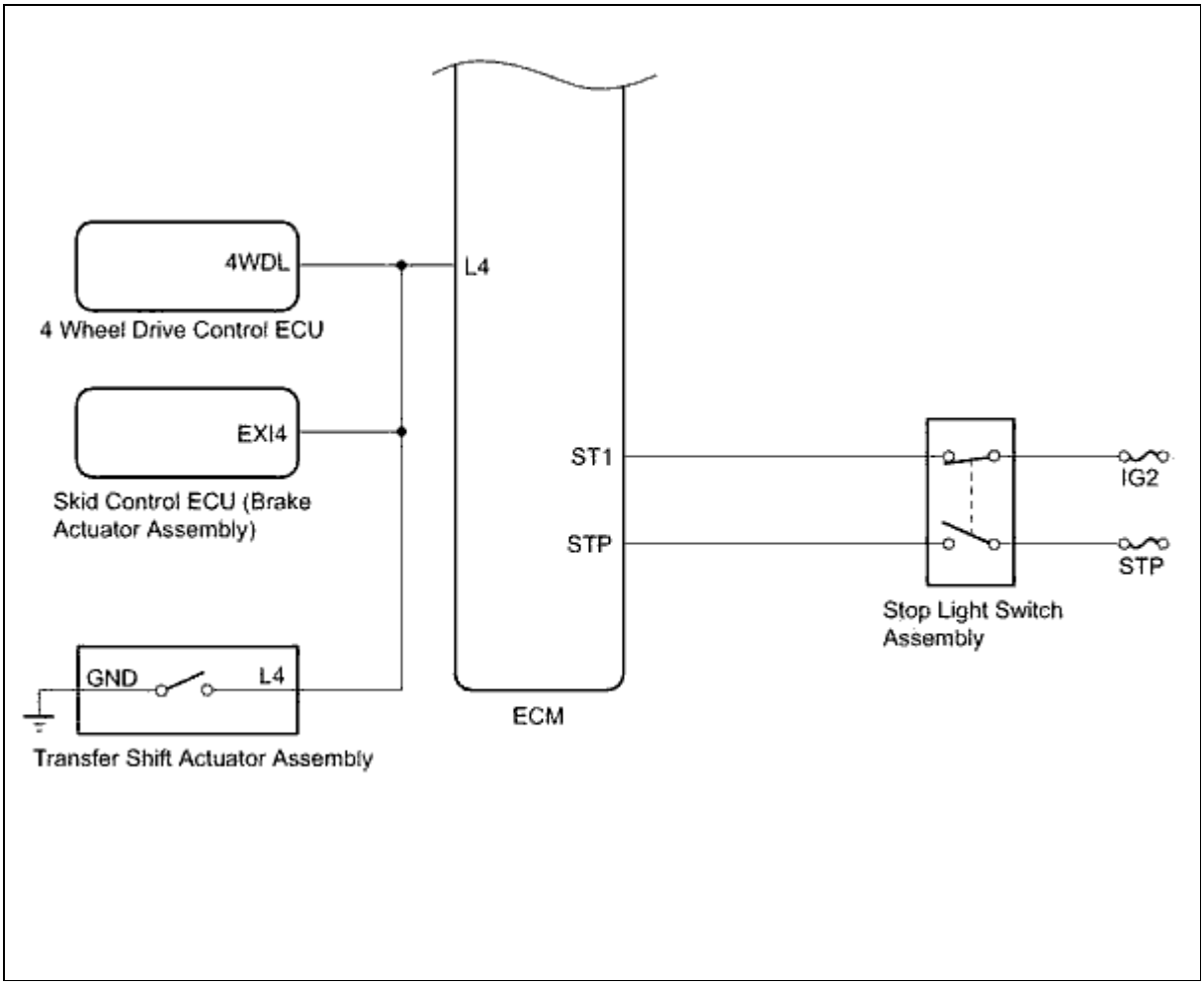
The configuration of the electronic control system in the AC60F automatic transmission is as shown in the following chart.



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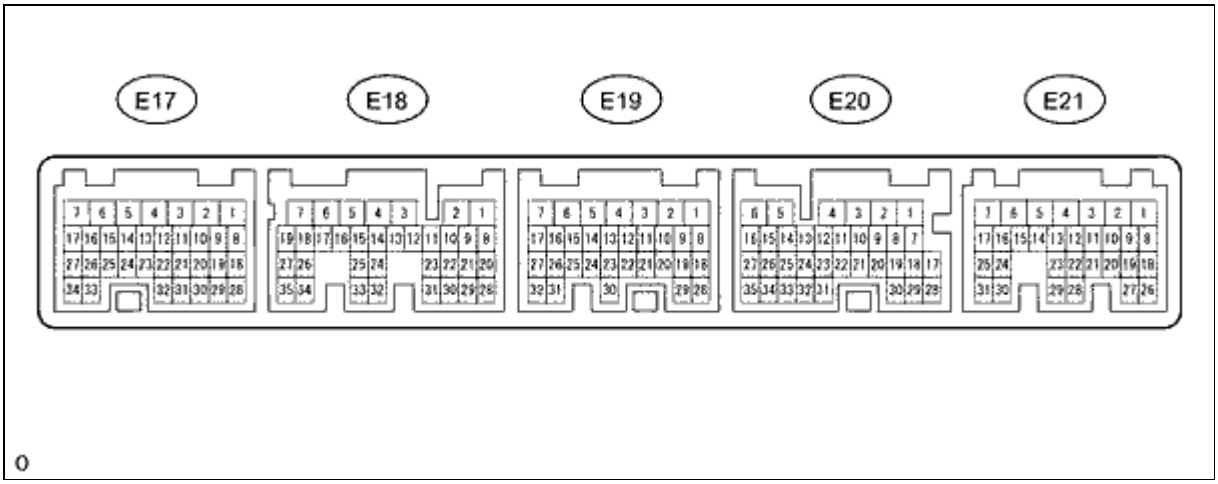


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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000001370078X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): TERMINALS OF ECM; 2016 MY Tacoma [08/2015 -]		

TERMINALS OF ECM

1. ECM



HINT:

The standard voltage between each pair of ECM terminals is shown in the table below. In the table, first follow the information under "Condition". Look under "Terminal No. (Symbol)" for the terminals to be inspected. The standard voltage between the terminals is shown under "Specified Condition".

Use the illustration above as a reference for the ECM terminals.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E18-9 (SP2O) - E17-3 (E1)	L - W-B	Transmission revolution sensor (SP2) signal	Vehicle driving	Pulse generation
E18-10 (SP2B) - E17-3 (E1)	G - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E18-12 (SL) - E17-3 (E1)	R - W-B	Shift solenoid valve SL signal	All gears	11 to 14 V
E18-15 (NSW) - E17-3 (E1)	V - W-B	Park/neutral position switch signal	Ignition switch ON and shift lever in P or N	Below 1 V
			Ignition switch ON and shift lever not in P or N	11 to 14 V
E19-2 (SLU+) - E19-1 (SLU-)	P - L	Shift solenoid valve SLU signal	2nd, 3rd, 4th, 5th or 6th gear (Flex lock-up on)	Pulse generation
E19-5 (SLT+) - E19-4 (SLT-)	LG - Y	Shift solenoid valve SLT signal	Engine idling	Pulse generation
E19-7 (SL2+) - E19-6 (SL2-)	GR - BE	Shift solenoid valve SL2 signal	4th, 5th or 6th gear	Pulse generation

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E19-9 (SL1+) - E19-8 (SL1-)	R - V	Shift solenoid valve SL1 signal	1st, 2nd, 3rd or 4th gear	Pulse generation
E19-13 (SL4+) - E19-12 (SL4-)	SB - BE	Shift solenoid valve SL4 signal	3rd or 5th gear	Pulse generation
E19-16 (SL3+) - E19-15 (SL3-)	B - W	Shift solenoid valve SL3 signal	2nd or 6th gear	Pulse generation
E19-17 (SFTU) - E17-3 (E1)	SB - W-B	Up-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "+" (Up-shift)	Below 1 V
E19-19 (NTO) - E17-3 (E1)	W - W-B	Transmission revolution sensor (NT) signal	Engine idling	Pulse generation
E19-20 (THO1) - E19-21 (ETHO)	P - V	No. 1 ATF temperature sensor signal	No. 1 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E19-22 (THO2) - E19-21 (ETHO)	L - V	No. 2 ATF temperature sensor signal	No. 2 ATF temperature: 115°C (239°F) or higher	Below 1.5 V
E19-24 (N) - E17-3 (E1)	G - W-B	N shift position switch signal	Ignition switch ON and shift lever in N	11 to 14 V
			Ignition switch ON and shift lever not in N	Below 1 V
E19-25 (P) - E17-3 (E1)	GR - W-B	P shift position switch signal	Ignition switch ON and shift lever in P	11 to 14 V
			Ignition switch ON and shift lever not in P	Below 1 V
E19-27 (SFTD) - E17-3 (E1)	R - W-B	Down-shift position switch signal	Ignition switch ON and shift lever in S	11 to 14 V
			Ignition switch ON and shift lever in "-" (Down-shift)	Below 1 V
E19-29 (NTB) - E17-3 (E1)	Y - W-B	Power source for sensor (fixed voltage)	Ignition switch ON	11 to 14 V
E19-30 (S) - E17-3 (E1)	B - W-B	S shift position switch signal	Ignition switch ON and shift lever in S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in S, "+" or "-"	Below 1 V
E20-8 (R) - E17-3 (E1)	V - W-B	R shift position switch signal	Ignition switch ON and shift lever in R	11 to 14 V
			Ignition switch ON and shift lever not in R	Below 1 V
E20-13 (CANH) - E17-3 (E1)	B - W-B	CAN communication line	Ignition switch ON	Pulse generation

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TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E20-14 (CANL) - E17-3 (E1)	W - W-B	CAN communication line	Ignition switch ON	Pulse generation
E20-18 (D) - E17-3 (E1)	SB - W-B	D shift position switch signal	Ignition switch ON and shift lever in D, S, "+" or "-"	11 to 14 V
			Ignition switch ON and shift lever not in D, S, "+" or "-"	Below 1 V
E21-14 (PWMS) - E17-3 (E1)	P - W-B	Pattern select switch signal	Ignition switch ON and pattern select switch pushed	Below 1 V
			Ignition switch ON and pattern select switch not pushed	11 to 14 V
E21-25 (L4) - E17-3 (E1)	GR - W-B	L4 position signal	Ignition switch ON and transfer in L4	Below 1 V
			Ignition switch ON and transfer not in L4	11 to 14 V

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Last Modified: 11-13-2015	6.6 J	**Doc ID:** RM000000WP10KNX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION SYSTEM (for 2TR-FE): Transmission Control Switch Circuit; 2016 MY Tacoma [08/2015 -]		

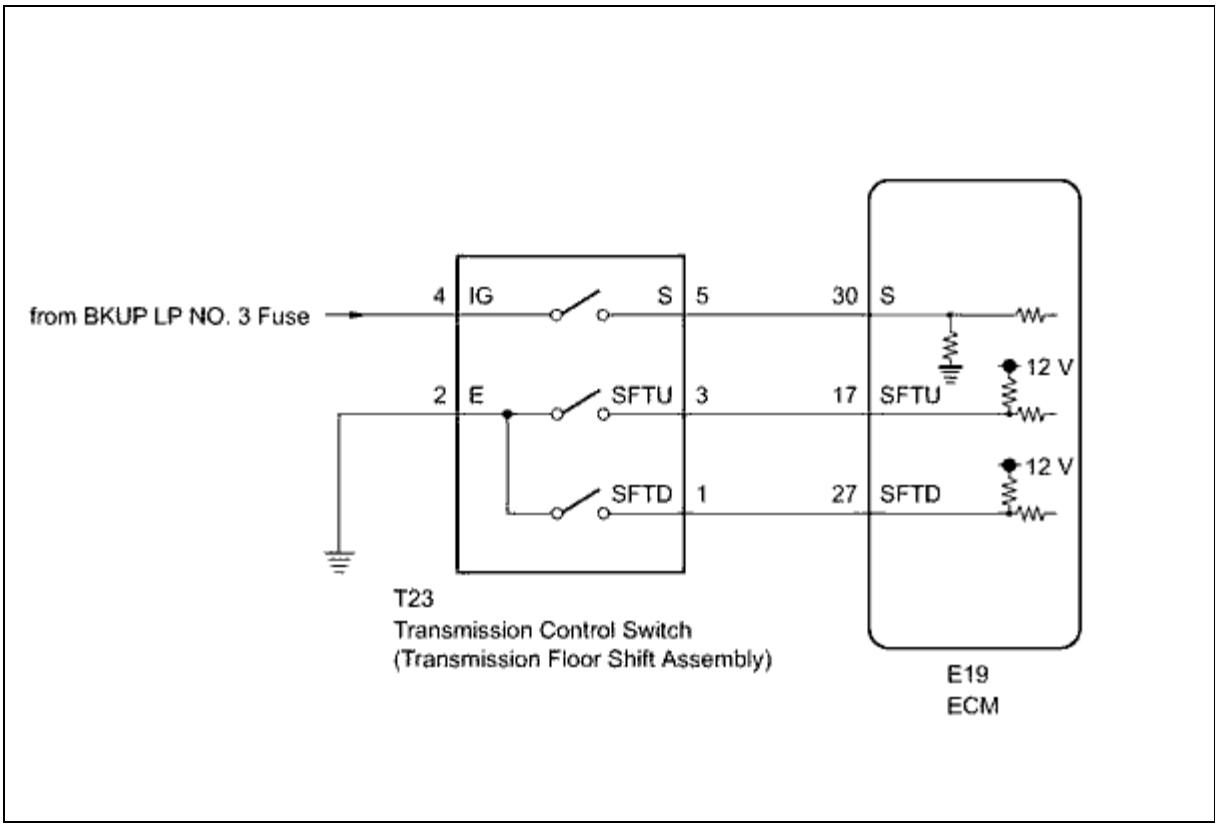
Transmission Control Switch Circuit

DESCRIPTION

After moving the shift lever to S, it is possible to switch the shift range between "1" (S1 range) and "6" (S6 range) using the transmission control switch.

Moving the shift lever to "+" once raises the shift range by one, and moving the shift lever to "-" once lowers the shift range by one.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (SPORTS MODE SELECTION SW)**

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(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Mode Selection SW	Sport mode select switch status/ ON or OFF	• ON: Shift lever in S, "+" or "-" • OFF: Shift lever not in S, "+" or "-"	-

Result

RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 6**

A ▼

2.	**READ VALUE USING TECHSTREAM (SPORTS SHIFT UP SW AND SPORTS SHIFT DOWN SW)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine and ECT / Data List.

(e) In accordance with the display on the Techstream, read the Data List.

Engine and ECT

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Sports Shift Up SW	Sport shift up switch status/ ON or OFF	• ON: Shift lever held in "+" (up-shift) • OFF: Shift lever not held in "+" (up-shift)	-
Sports Shift Down SW	Sport shift down switch status/ ON or OFF	• ON: Shift lever held in "-" (down-shift) • OFF: Shift lever not held in "-" (down-shift)	-

Result

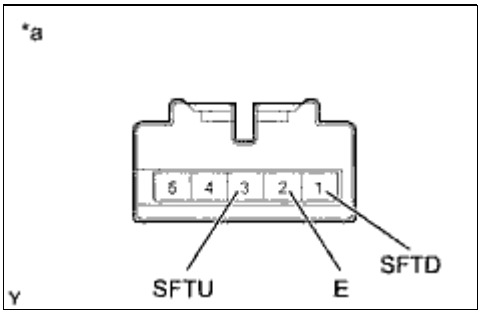
RESULT	PROCEED TO
Data display is within Normal Condition range	A
Data display is not within Normal Condition range	B

B ▶ **GO TO STEP 3**

A ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

3.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

(a) Disconnect T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever held in "+" (Up-shift)	Below 1 Ω
1 (SFTD) - 2 (E)	Shift lever held in "-" (Down-shift)	Below 1 Ω

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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (SFTU) - 2 (E)	Shift lever not held in "+"	10 kΩ or higher
1 (SFTD) - 2 (E)	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

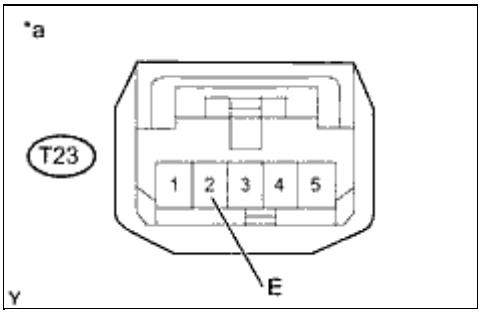
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

4.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - BODY GROUND)**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-2 (E) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

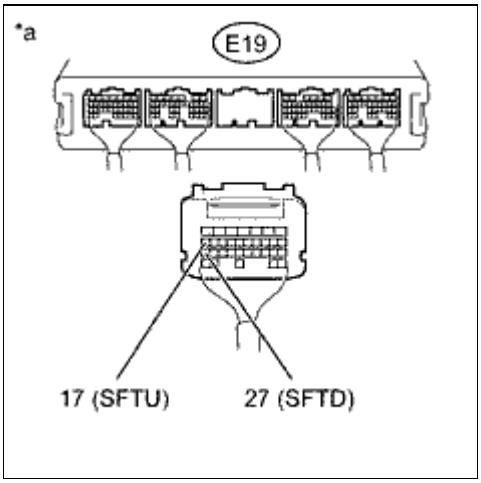
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

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5.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH - ECM)**

(a) Disconnect the ECM connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
E19-17 (SFTU) - Body ground	Shift lever held in "+" (Up-shift)	Below 1 Ω
E19-27 (SFTD) - Body ground	Shift lever held in "-" (Down-shift)	Below 1 Ω
E19-17 (SFTU) - Body ground and other terminals	Shift lever not held in "+"	10 kΩ or higher
E19-27 (SFTD) - Body ground and other terminals	Shift lever not held in "-"	10 kΩ or higher

Text in Illustration

*a	Rear view of wire harness connector (to ECM)

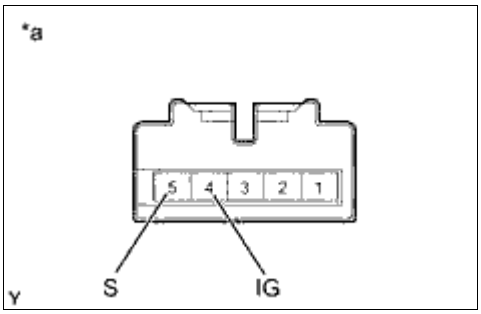
NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

6.	**INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

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(a) Disconnect T23 transmission control switch (transmission floor shift assembly) connector.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "- "	Below 1 Ω
4 (IG) - 5 (S)	Shift lever not in S, "+" or "-"	10 kΩ or higher

Text in Illustration

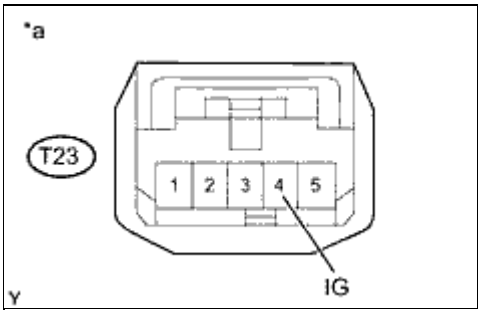
*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPLACE TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)**

OK ▼

7.	**CHECK HARNESS AND CONNECTOR (BATTERY - TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY))**

(a) Disconnect the transmission control switch (transmission floor shift assembly) connector.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION

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TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
T23-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
T23-4 (IG) - Body ground	Ignition switch off	Below 1 V

Text in Illustration

*a	Front view of wire harness connector (to Transmission Control Switch (Transmission Floor Shift Assembly))

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

8.	**CHECK HARNESS AND CONNECTOR (TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY) - ECM)**

(a) Disconnect the T23 transmission control switch (transmission floor shift assembly) connector.

(b) Disconnect the E19 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
T23-5 (S) - E19-30 (S)	Always	Below 1 Ω
T23-5 (S) - Body ground	Always	10 kΩ or higher
E19-30 (S) - Body ground	Always	10 kΩ or higher

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

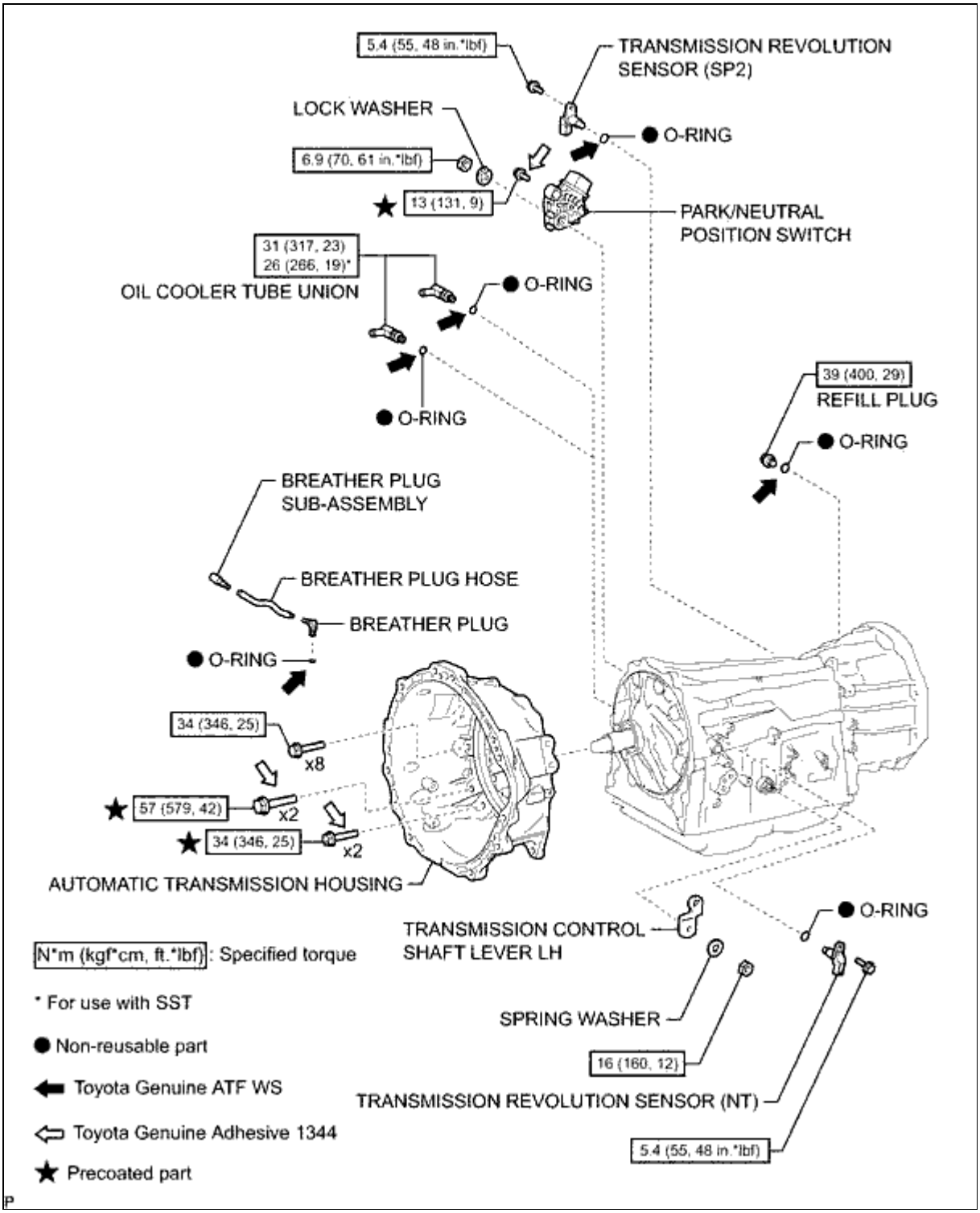
OK ▶ **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000O9X045X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

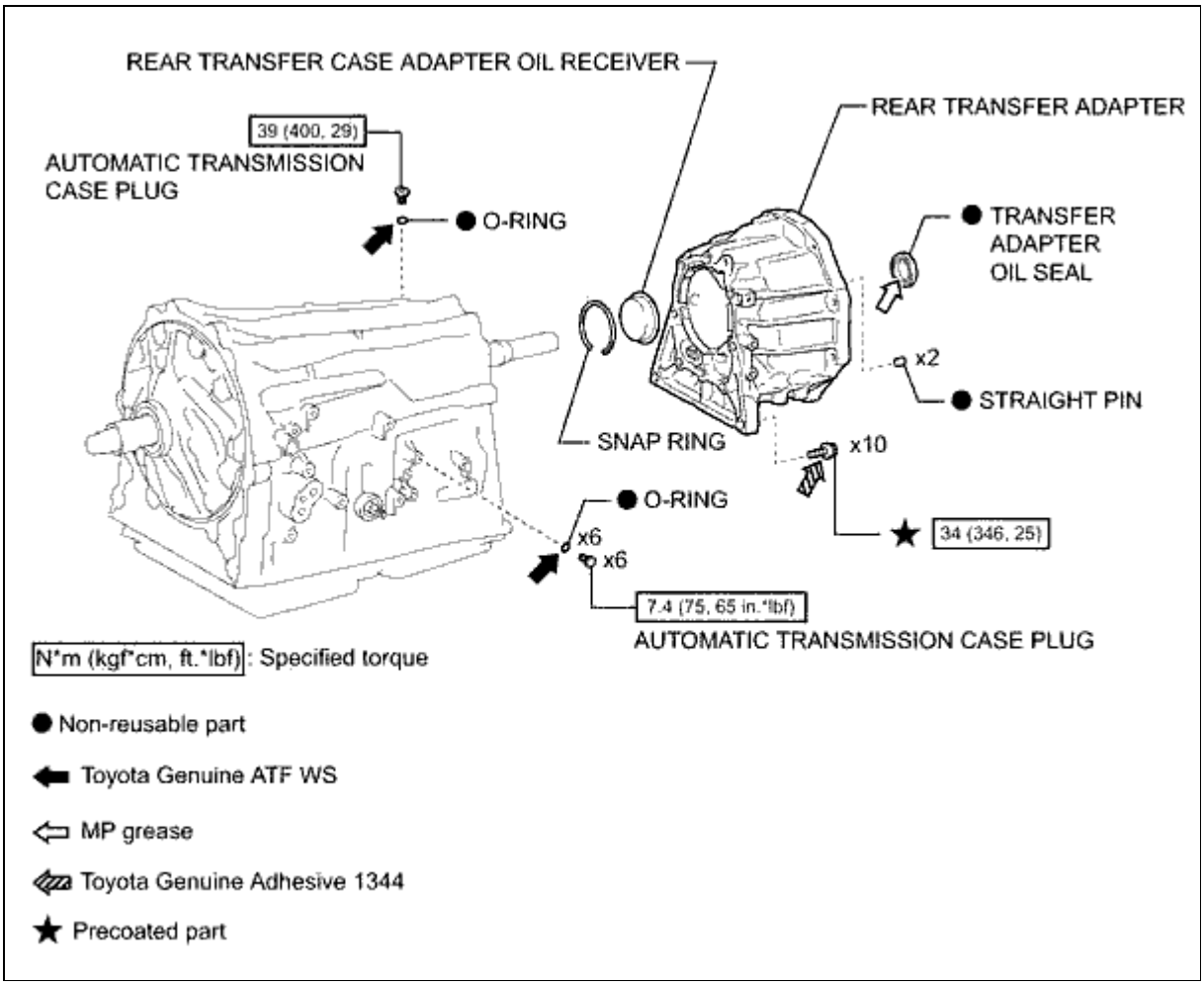
COMPONENTS

ILLUSTRATION



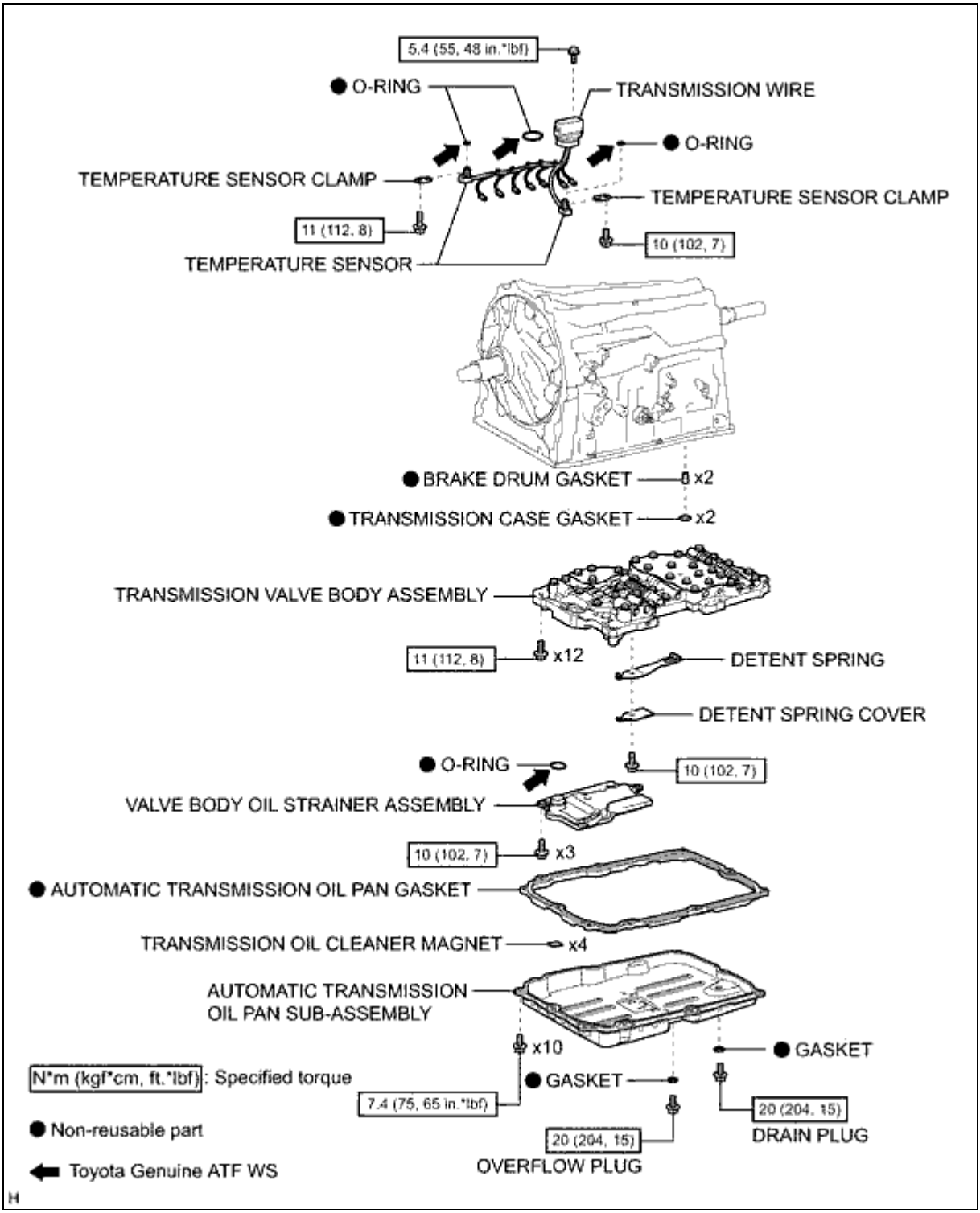
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ILLUSTRATION



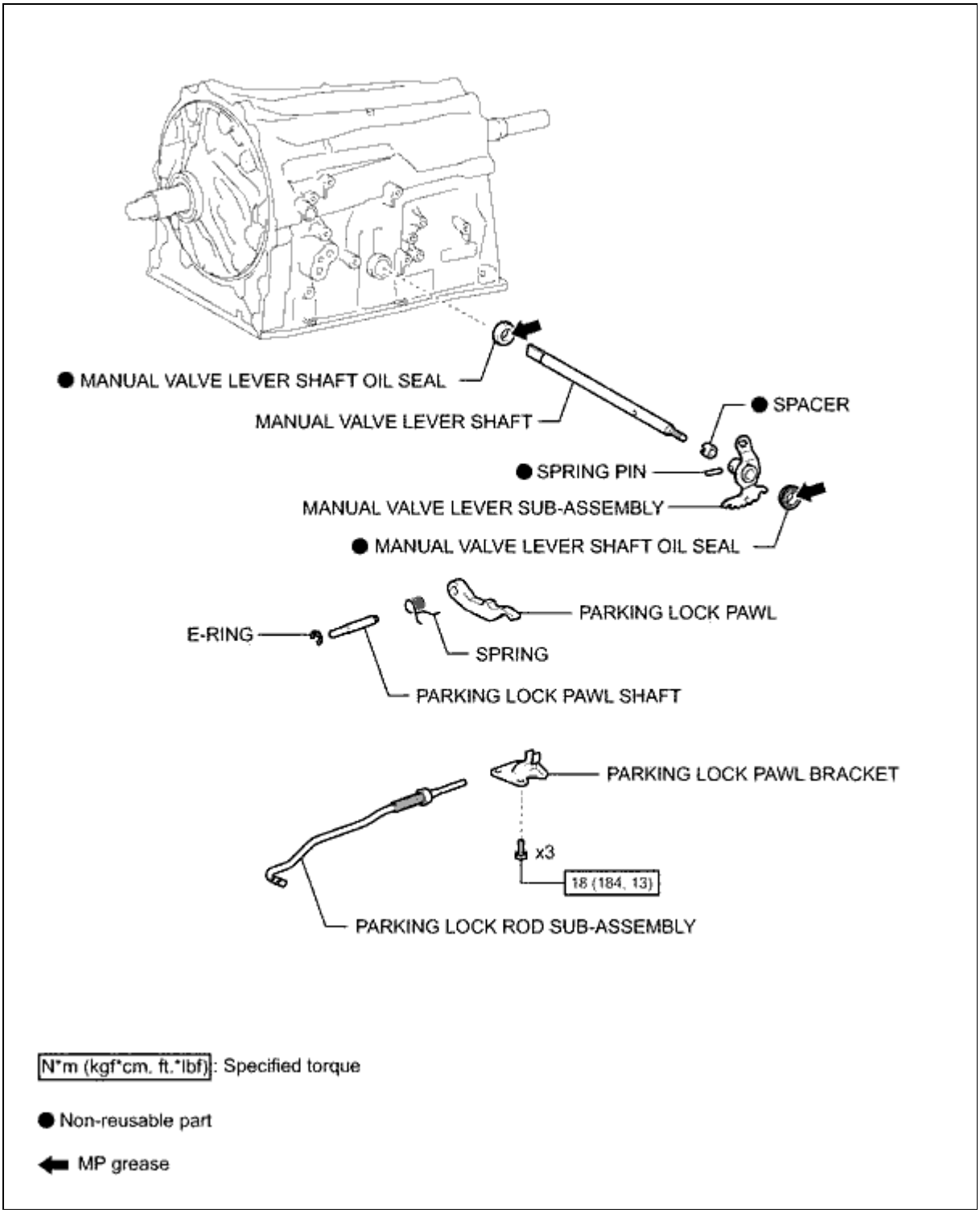
ILLUSTRATION

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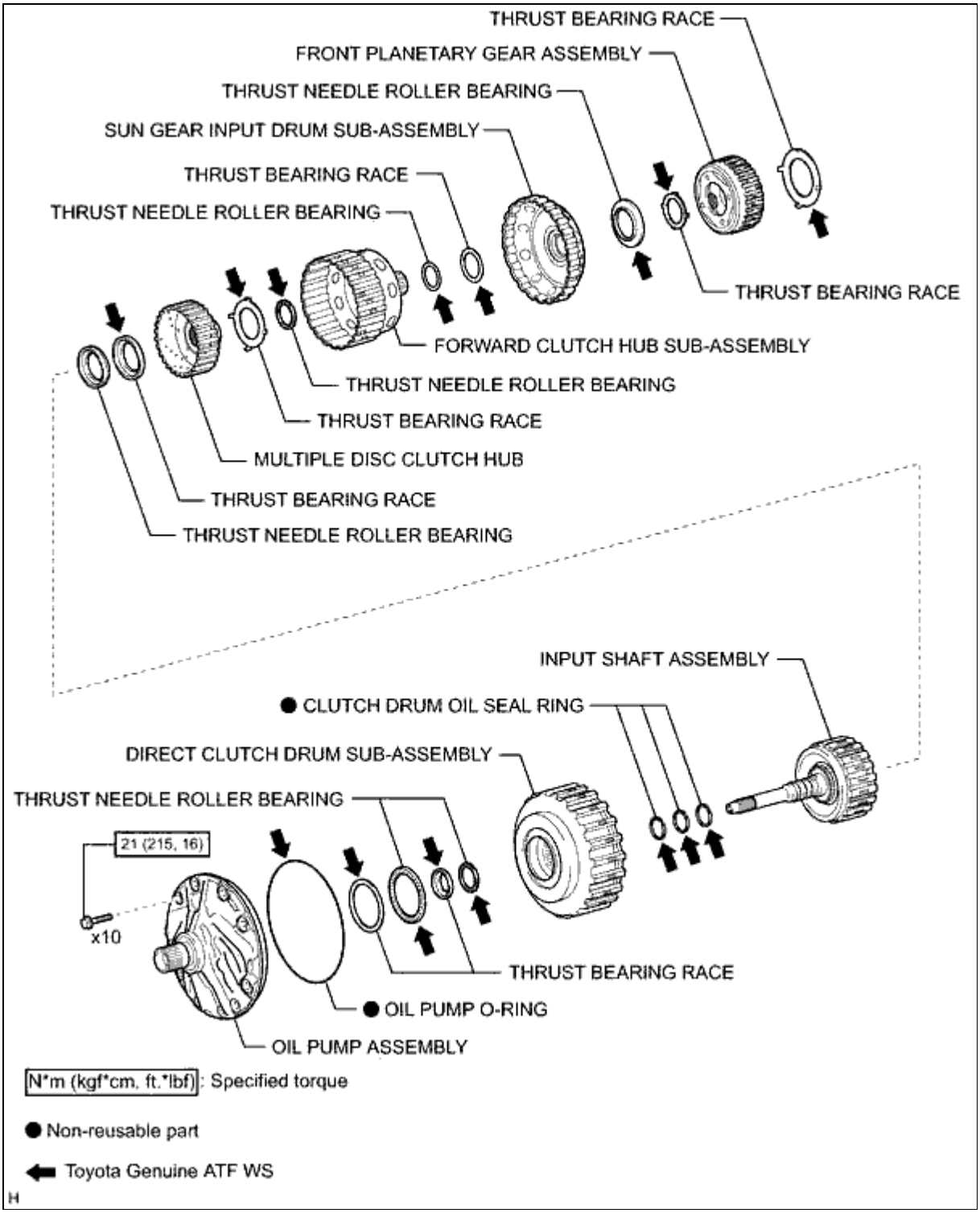
ILLUSTRATION

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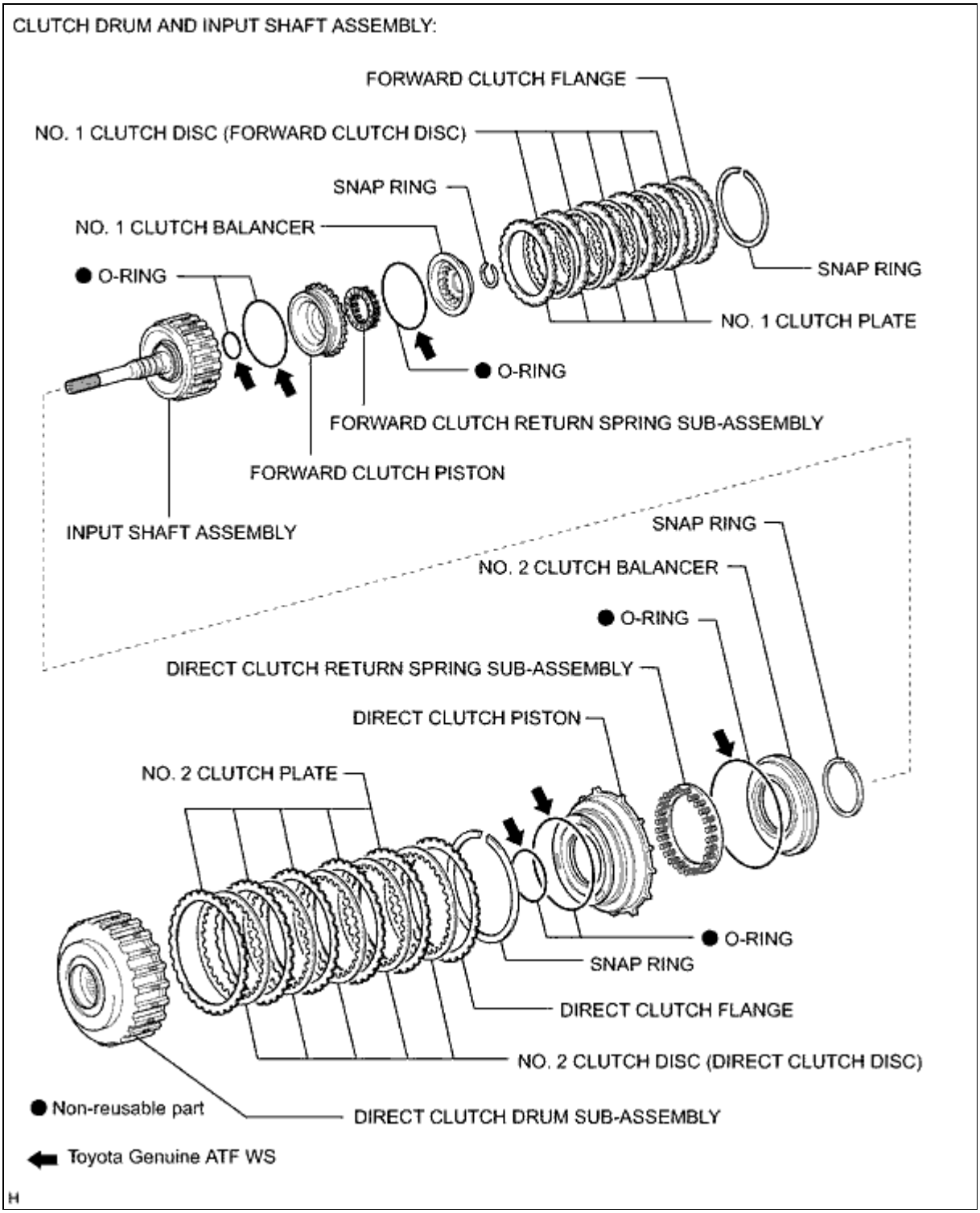
ILLUSTRATION

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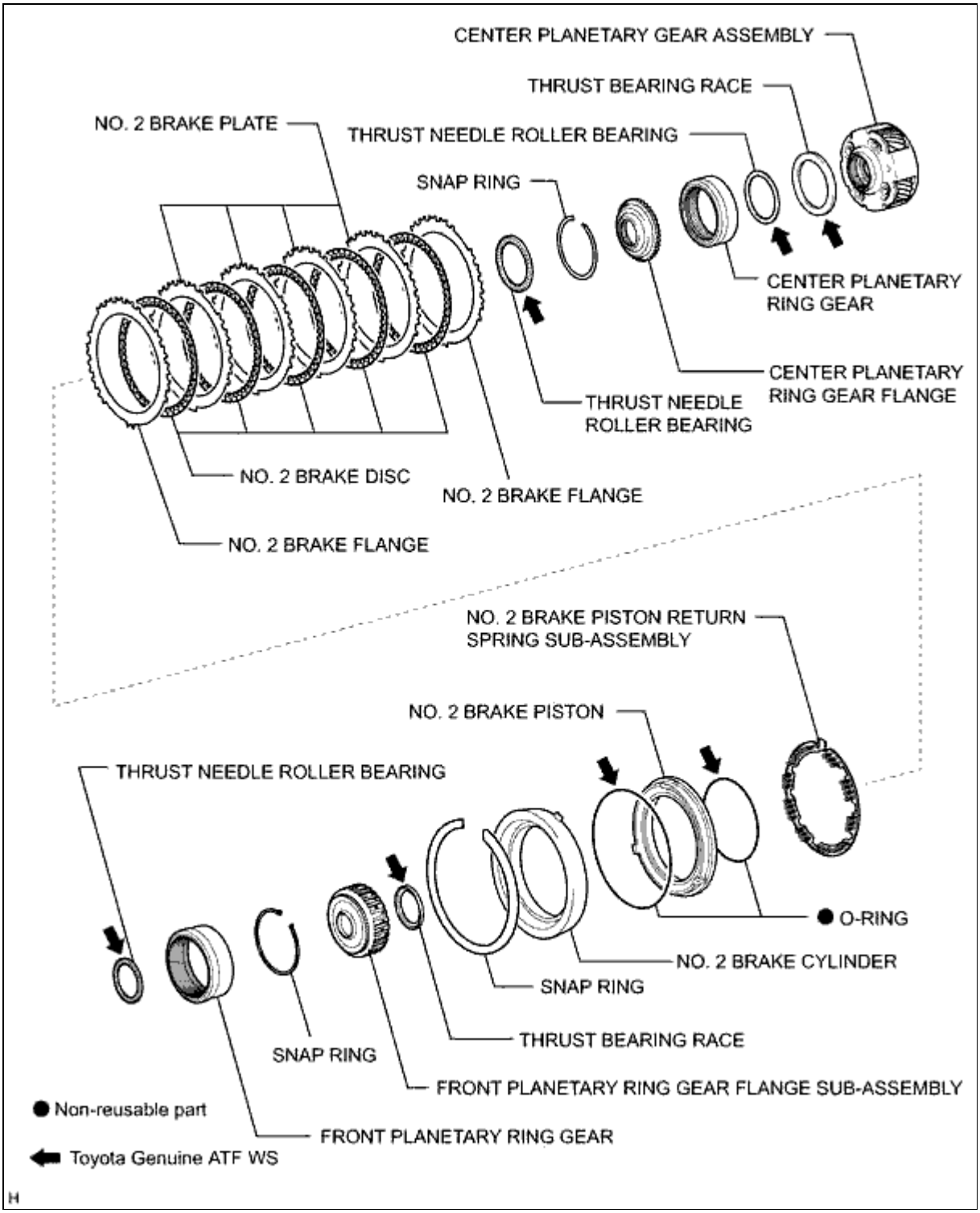
ILLUSTRATION

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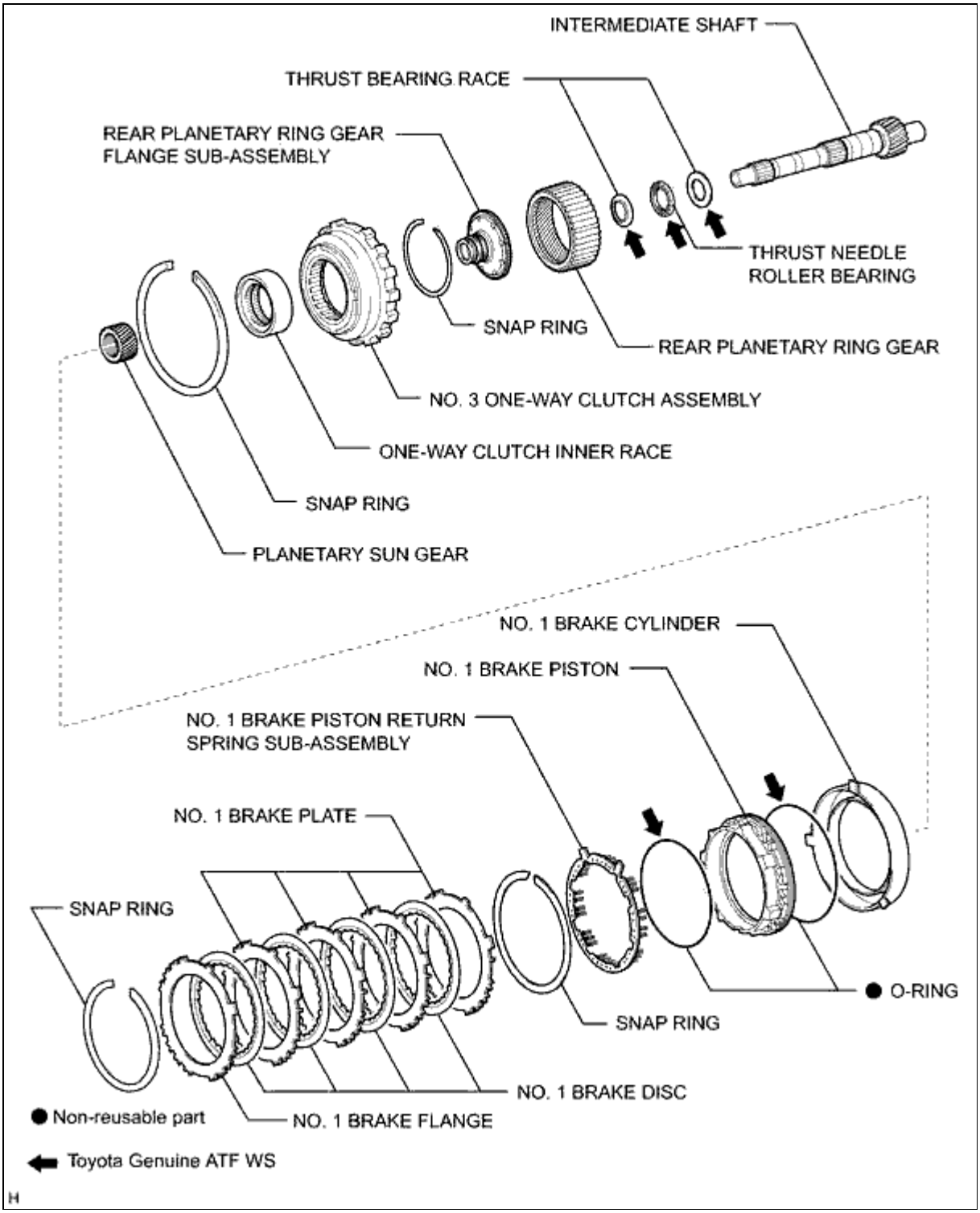
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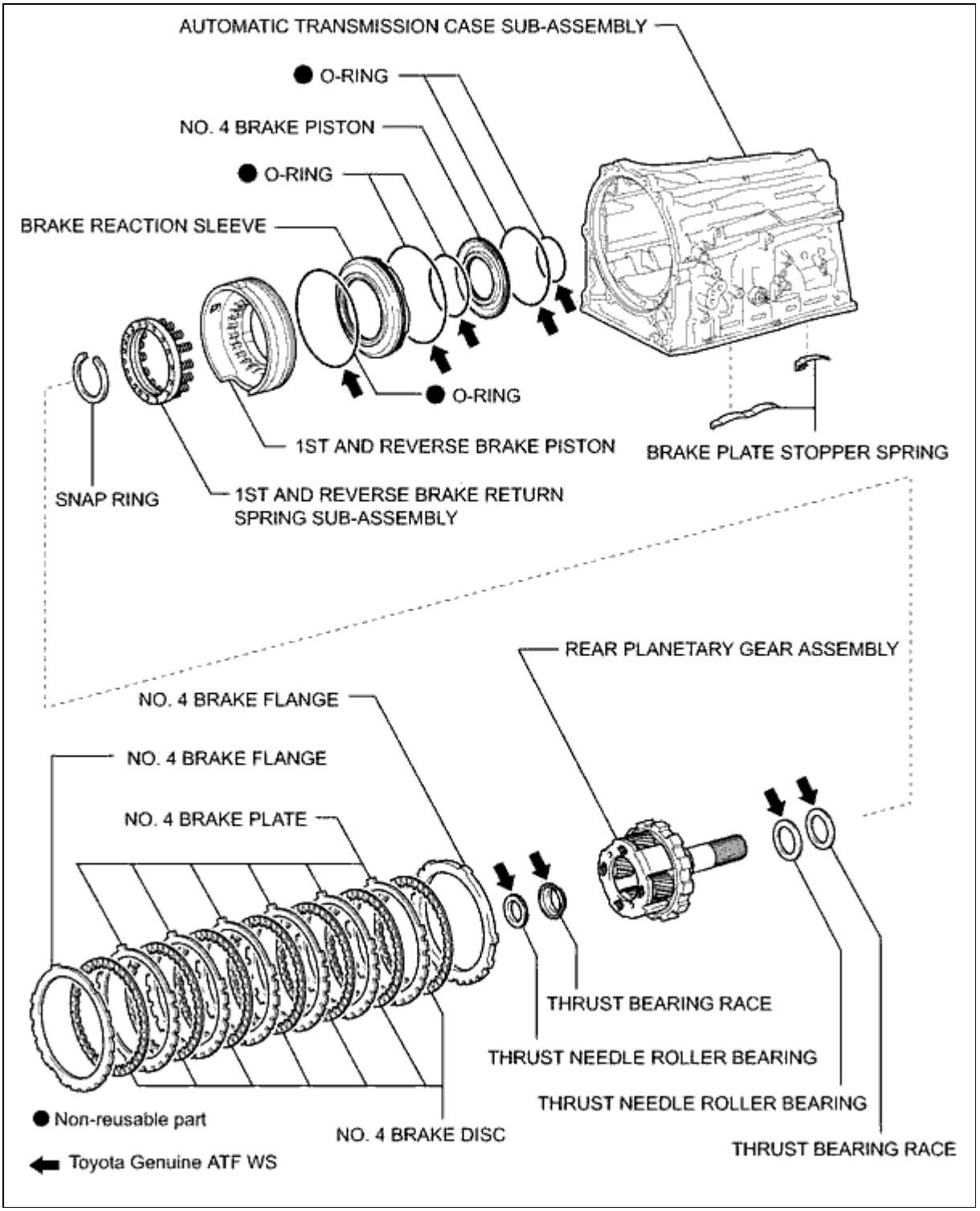
ILLUSTRATION

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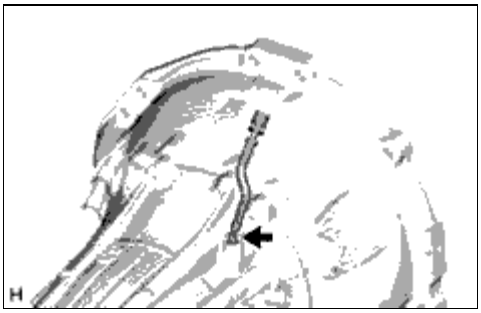
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9Z04ZX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. REMOVE BREATHER PLUG HOSE

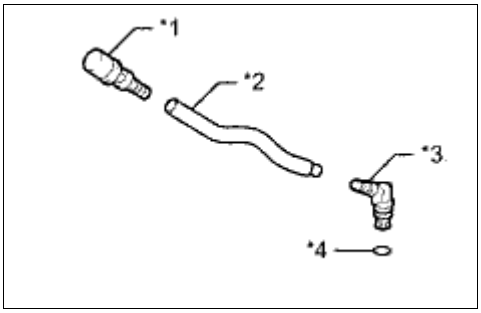
(a) Remove the breather plug hose from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the breather plug.

Text in Illustration

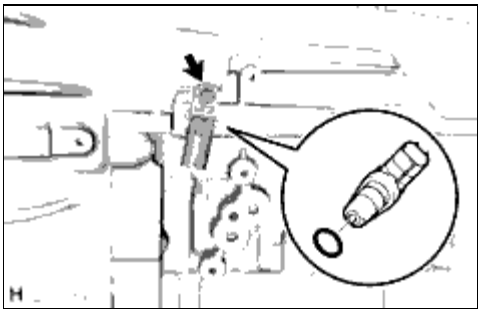
*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring



(c) Remove the breather plug sub-assembly and breather plug from the breather plug hose.

2. REMOVE TRANSMISSION REVOLUTION SENSOR

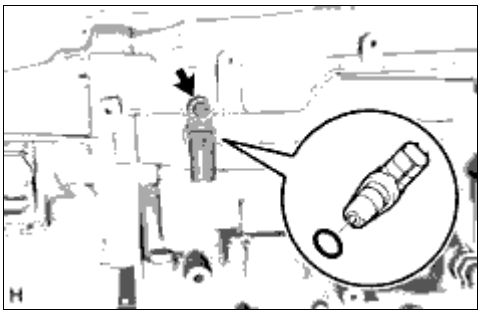
(a) Remove the bolt and transmission revolution sensor (NT) from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the transmission revolution sensor (NT).

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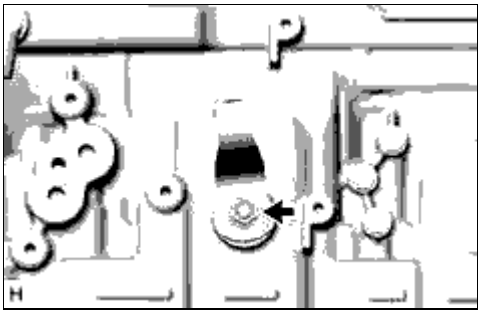
(c) Remove the bolt and transmission revolution sensor (SP2) from the automatic transmission case sub-assembly.



(d) Remove the O-ring from the transmission revolution sensor (SP2).

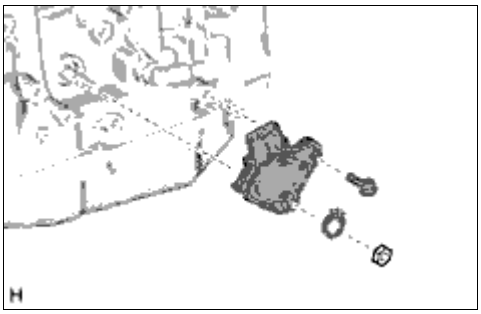
3. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH

(a) Remove the nut, spring washer and transmission control shaft lever LH from the manual valve lever shaft.



4. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Using a screwdriver, bend the tabs of the lock washer.



(b) Remove the nut and the lock washer.

(c) Remove the bolt and park/neutral position switch from the automatic transmission case sub-assembly.

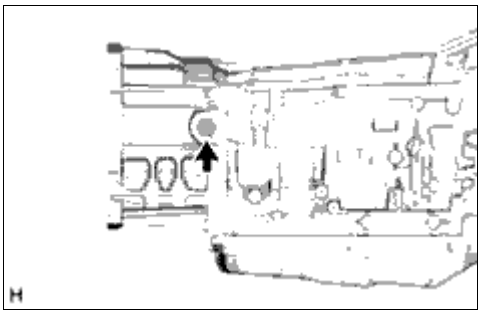
HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

5. REMOVE REFILL PLUG

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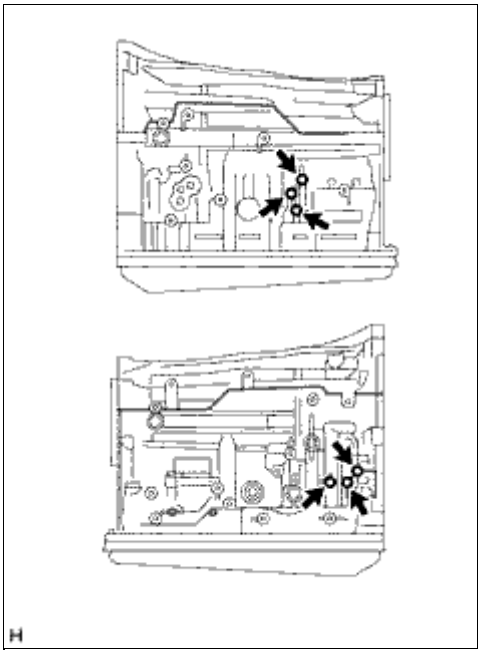
(a) Remove the refill plug from the rear transfer adapter.



(b) Remove the O-ring from the refill plug.

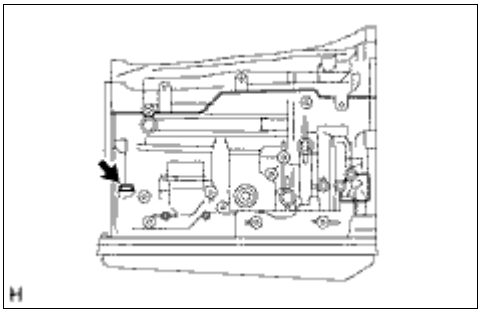
6. REMOVE AUTOMATIC TRANSMISSION CASE PLUG

(a) Remove the 6 automatic transmission case plugs from the automatic transmission case sub-assembly.



(b) Remove the 6 O-rings from the 6 automatic transmission case plugs.

(c) Using a T55 "TORX" socket wrench, remove the automatic transmission case plug from the automatic transmission case sub-assembly.

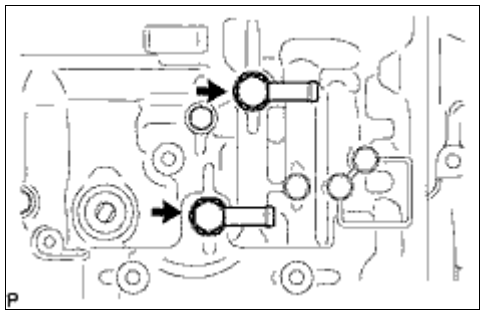


(d) Remove the O-ring from the automatic transmission case plug.

7. REMOVE OIL COOLER TUBE UNION

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(a) Remove the 2 oil cooler tube unions from the automatic transmission case sub-assembly.



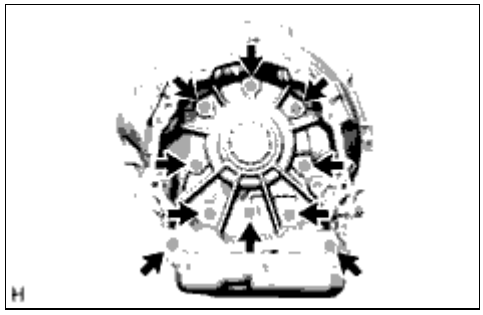
(b) Remove the 2 O-rings from the 2 oil cooler tube unions.

8. REMOVE REAR TRANSFER ADAPTER

(a) Remove the 10 bolts and rear transfer adapter from the automatic transmission case sub-assembly.

HINT:

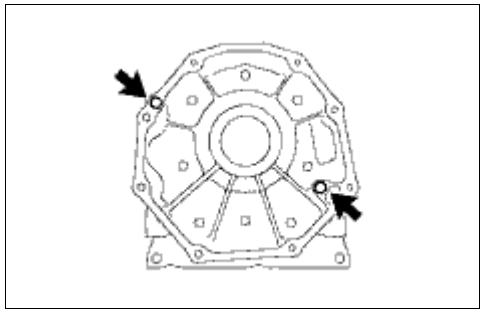
Use a brass bar and hammer to remove the rear transfer adapter.



(b) Remove the 2 straight pins from the rear transfer adapter.

HINT:

It is not necessary to remove the straight pins they are being replaced.

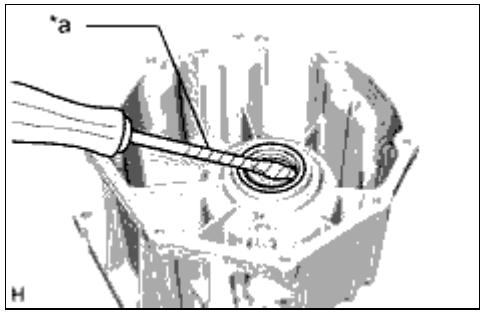


9. REMOVE TRANSFER ADAPTER OIL SEAL

(a) Using a screwdriver, pry out the transfer adapter oil seal from the rear transfer adapter.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the rear transfer adapter.

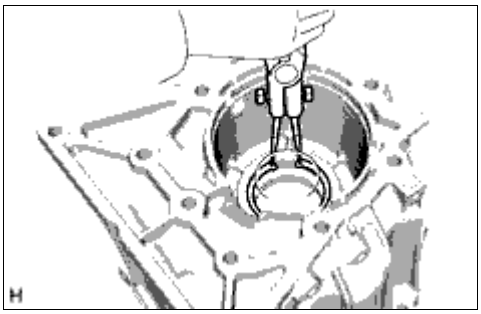
HINT:

Tape the screwdriver tip before use.

10. REMOVE REAR TRANSFER CASE ADAPTER OIL RECEIVER

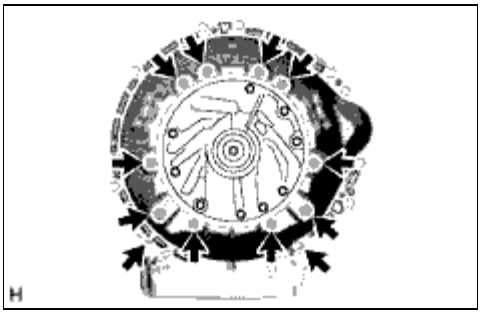
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(a) Using snap ring pliers, remove the snap ring and rear transfer case adapter oil receiver from the rear transfer adapter.



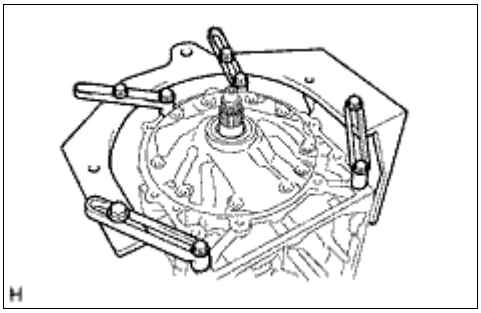
11. REMOVE AUTOMATIC TRANSMISSION HOUSING

(a) Remove the 12 bolts and automatic transmission housing from the automatic transmission case sub-assembly.



12. SECURE AUTOMATIC TRANSMISSION CASE SUB-ASSEMBLY

(a) Install the automatic transmission case sub-assembly to an overhaul attachment.



13. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

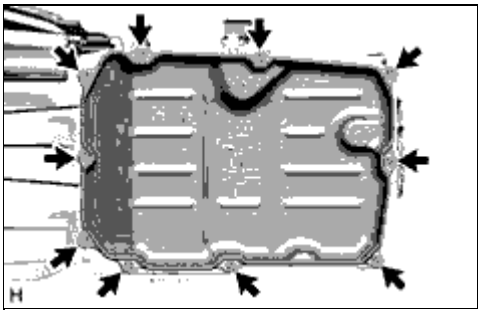
NOTICE:

Do not turn the transmission over as this will contaminate the transmission valve body assembly with foreign matter located at the bottom of the automatic transmission oil pan sub-assembly.

(a) Using a 5 mm socket hexagon wrench, remove the overflow plug and gasket.

(b) Remove the drain plug and gasket.

(c) Remove the 10 bolts, automatic transmission oil pan sub-assembly and automatic transmission oil pan gasket.



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(d) Remove the 4 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

(e) Examine the particles in the automatic transmission oil pan sub-assembly.

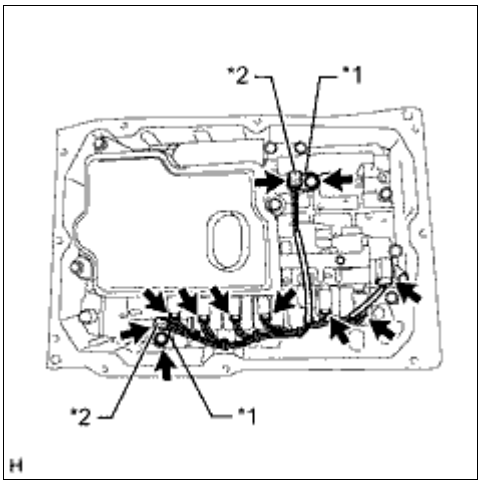
(1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.

Steel (magnetic): bearing, gear and clutch plate wear

Brass (non-magnetic): bush wear

14. REMOVE TRANSMISSION WIRE

(a) Remove the 2 bolts and 2 temperature sensor clamps, and disconnect the 2 temperature sensors.

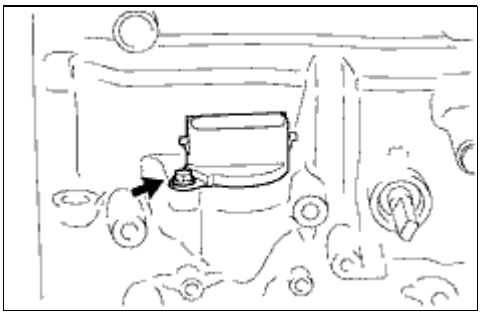


Text in Illustration

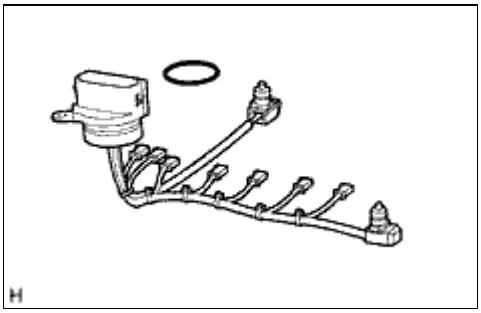
*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Disconnect the 7 solenoid valve connectors and transmission wire from the transmission valve body assembly.

(c) Remove the bolt and pull out the transmission wire from the automatic transmission case sub-assembly.

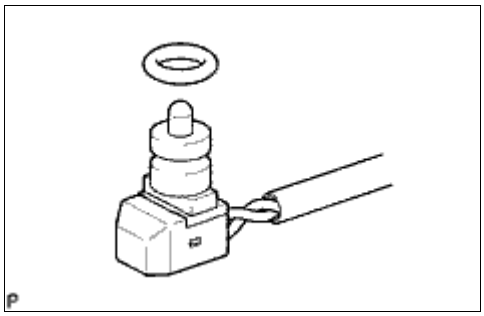


(d) Remove the O-ring from the connector of transmission wire.



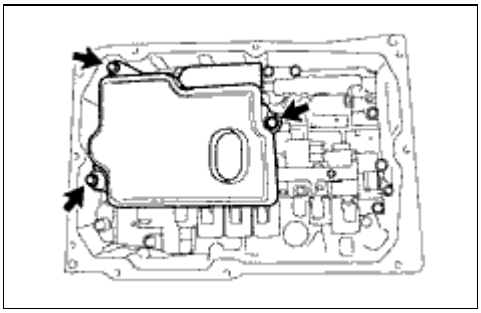
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(e) Remove the 2 O-rings from the 2 temperature sensors.



15. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

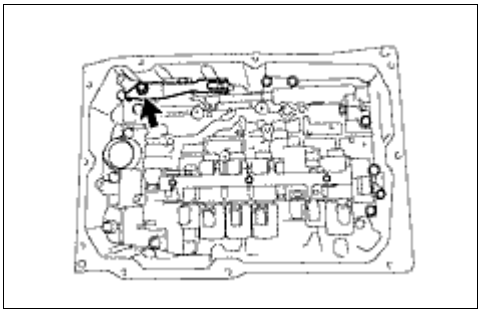
(a) Remove the 3 bolts and valve body oil strainer assembly from the transmission valve body assembly.



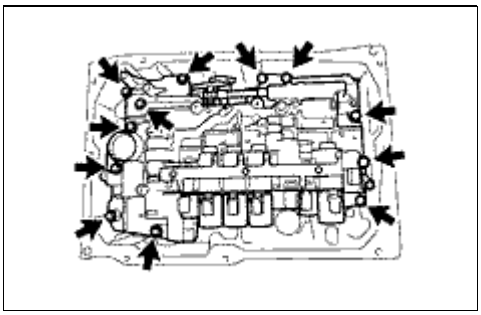
(b) Remove the O-ring from the valve body oil strainer assembly.

16. REMOVE TRANSMISSION VALVE BODY ASSEMBLY

(a) Remove the bolt, detent spring cover and detent spring from the transmission valve body assembly.



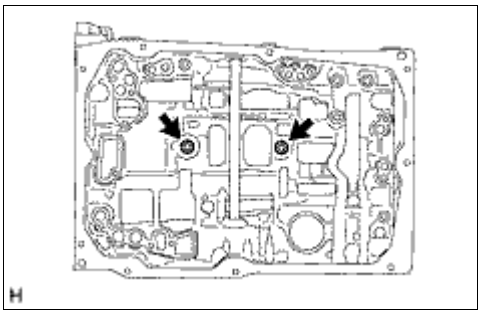
(b) Remove the 12 bolts and transmission valve body assembly from the automatic transmission case sub-assembly.



17. REMOVE TRANSMISSION CASE GASKET

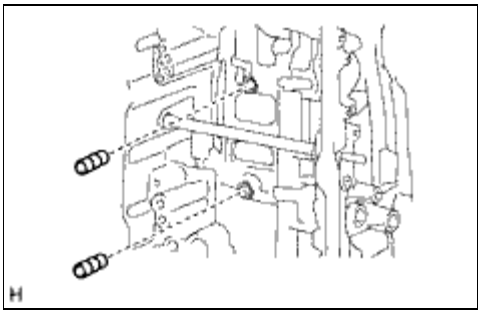
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(a) Remove the 2 transmission case gaskets from the automatic transmission case sub-assembly.



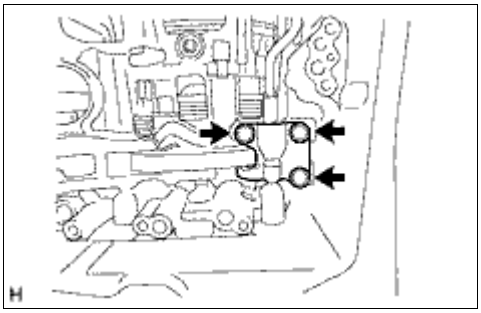
18. REMOVE BRAKE DRUM GASKET

(a) Remove the 2 brake drum gaskets from the automatic transmission case sub-assembly.



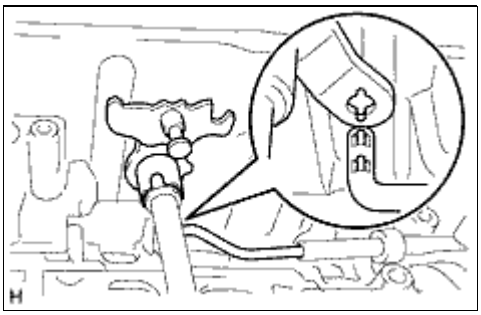
19. REMOVE PARKING LOCK PAWL BRACKET

(a) Remove the 3 bolts and parking lock pawl bracket from the automatic transmission case sub-assembly.



20. REMOVE PARKING LOCK ROD SUB-ASSEMBLY

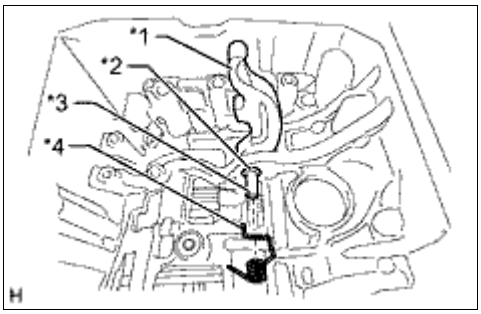
(a) Remove the parking lock rod sub-assembly from the manual valve lever sub-assembly.



21. REMOVE PARKING LOCK PAWL SHAFT

cardiagn.com

(a) Pull out the parking lock pawl shaft from the front side, and remove the parking lock pawl and spring.



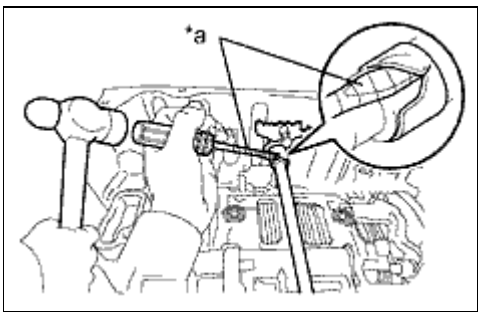
Text in Illustration

*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring

(b) Remove the E-ring from the parking lock pawl shaft.

22. REMOVE MANUAL VALVE LEVER SUB-ASSEMBLY

(a) Using a screwdriver and hammer, cut off the spacer and remove it from the manual valve lever shaft.



Text in Illustration

*a	Protective Tape

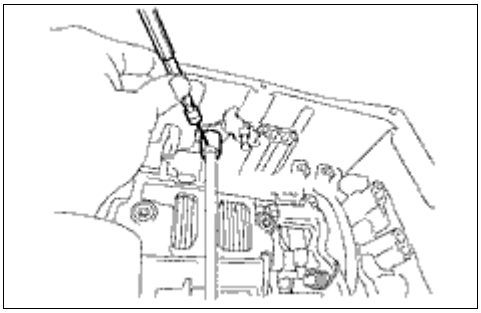
NOTICE:

Be careful not to damage the manual valve lever shaft.

HINT:

Tape the screwdriver tip before use.

(b) Using a 3 mm pin punch and hammer, drive out the spring pin.



HINT:

Slowly drive out the spring pin so that it does not fall into the automatic transmission case sub-assembly.

(c) Pull the manual valve lever shaft out through the case and remove the manual valve lever sub-assembly.

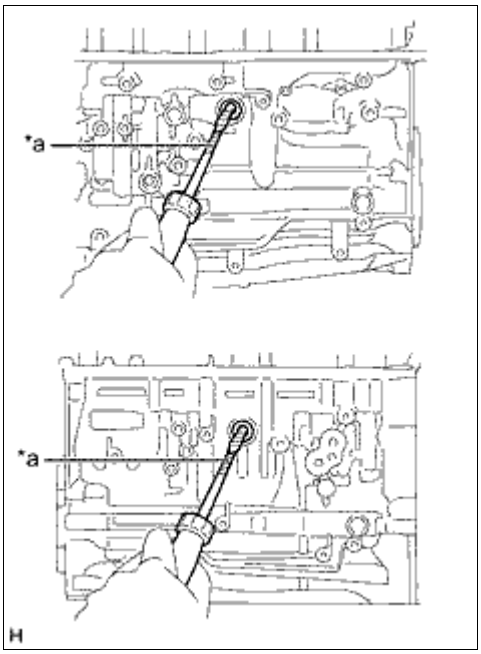
23. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

cardiagn.com

(a) Using a screwdriver, pry out the 2 manual valve lever shaft oil seals from the automatic transmission case sub-assembly.

Text in Illustration

*a	Protective Tape



NOTICE:

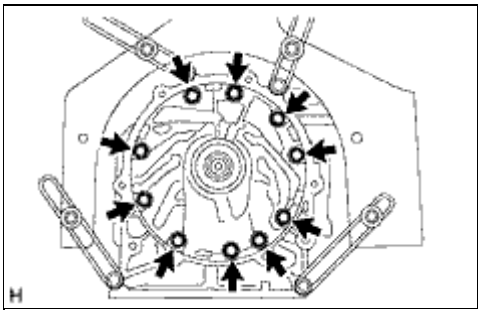
Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

24. REMOVE OIL PUMP ASSEMBLY

(a) Remove the 10 bolts.

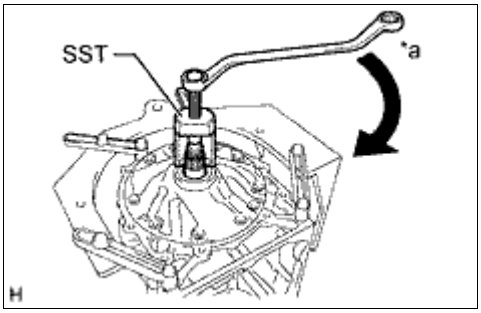


(b) Using SST, pull out the oil pump assembly from the automatic transmission case sub-assembly.

Text in Illustration

*a	Turn

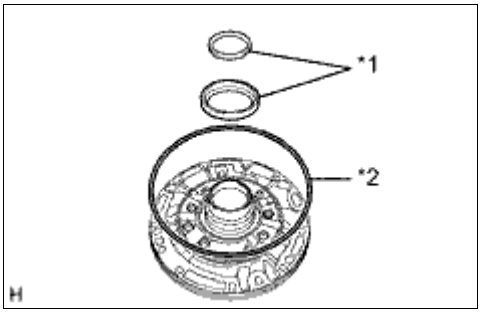
SST: 09610-20012



(c) Remove the 2 thrust bearing races from the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race
*2	Oil Pump O-ring

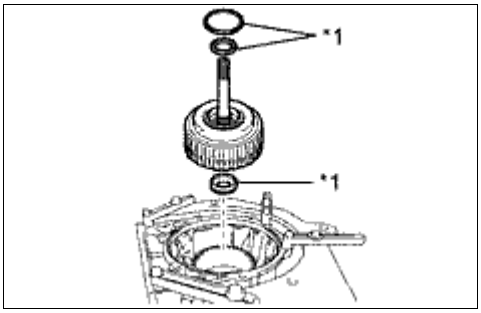


cardiagn.com

(d) Remove the oil pump O-ring from the oil pump assembly.

25. REMOVE CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

(a) Remove the clutch drum and input shaft assembly from the automatic transmission case sub-assembly.



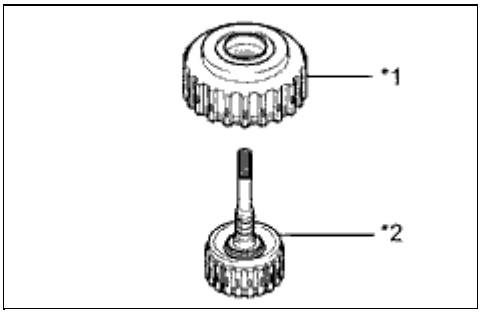
Text in Illustration

*1	Thrust Needle Roller Bearing

(b) Remove the 3 thrust needle roller bearings from the clutch drum and input shaft assembly.

26. REMOVE DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Remove the direct clutch drum sub-assembly from the input shaft sub-assembly.



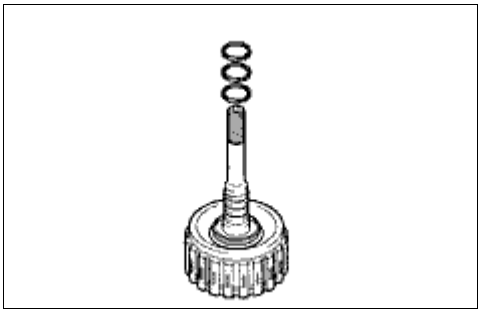
Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly

27. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH) INFO

28. REMOVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 3 clutch drum oil seal rings from the input shaft sub-assembly.



29. REMOVE NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Secure the input shaft sub-assembly in a vise between aluminum plates.

NOTICE:

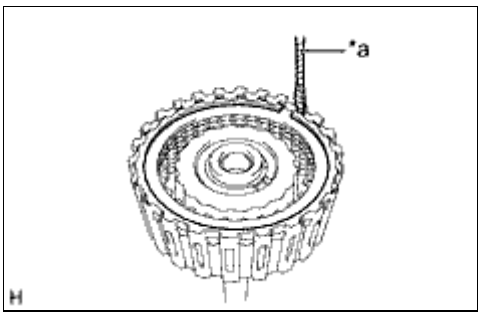
Do not overtighten the vise.

cardiagn.com

(b) Using a screwdriver, remove the snap ring.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the input shaft sub-assembly.

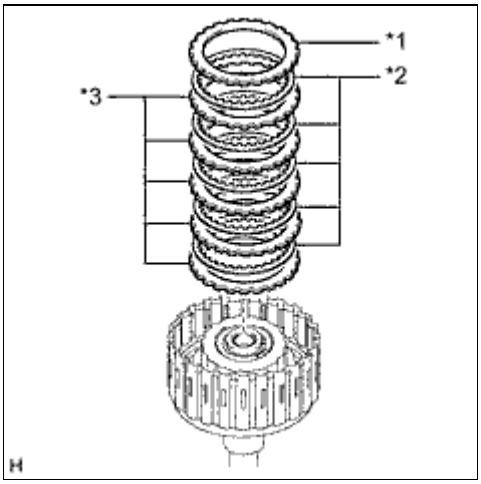
HINT:

Tape the screwdriver tip before use.

(c) Remove the forward clutch flange, 5 No. 1 clutch discs and 5 No. 1 clutch plates from the input shaft sub-assembly.

Text in Illustration

*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

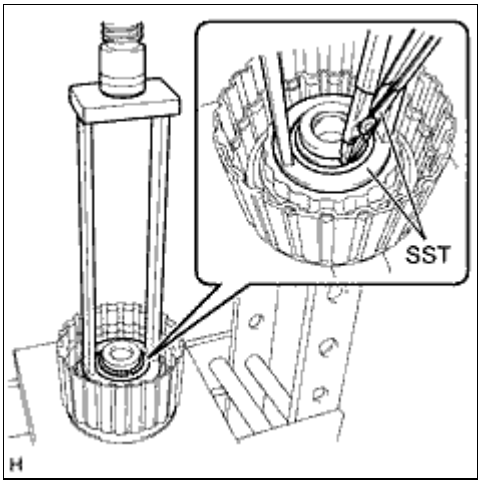


30. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC) INFO

31. REMOVE NO. 1 CLUTCH BALANCER

(a) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110



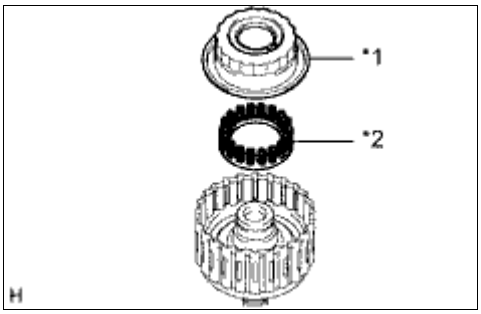
(b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070

cardiagn.com

(c) Remove the No. 1 clutch balancer and forward clutch return spring sub-assembly from the input shaft sub-assembly.



Text in Illustration

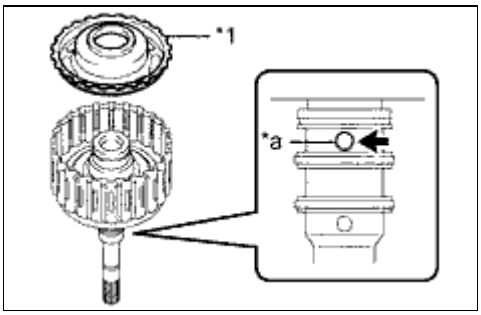
*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

(d) Remove the O-ring from the No. 1 clutch balancer.

32. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

33. REMOVE FORWARD CLUTCH PISTON

(a) While holding the forward clutch piston, apply compressed air to the oil hole of the input shaft sub-assembly to remove the forward clutch piston from the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Piston
*a	Oil Hole

(b) Remove the O-ring from the forward clutch piston.

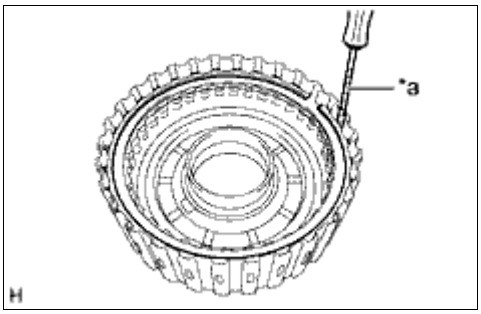
(c) Remove the O-ring from the input shaft sub-assembly.

34. INSPECT INPUT SHAFT SUB-ASSEMBLY INFO

35. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

36. REMOVE NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Using a screwdriver, remove the snap ring from the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

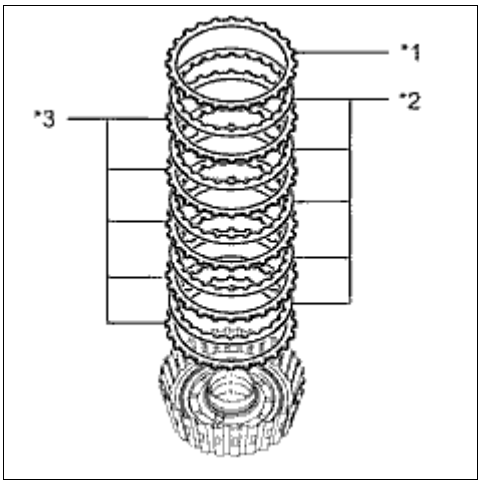
Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

cardiagn.com

(b) Remove the direct clutch flange, 5 No. 2 clutch discs and 5 No. 2 clutch plates from the direct clutch drum sub-assembly.



Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

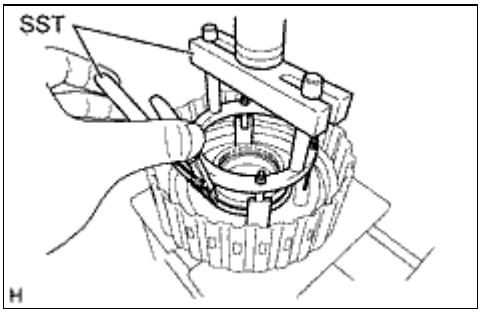
37. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC) INFO

38. REMOVE NO. 2 CLUTCH BALANCER

(a) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110

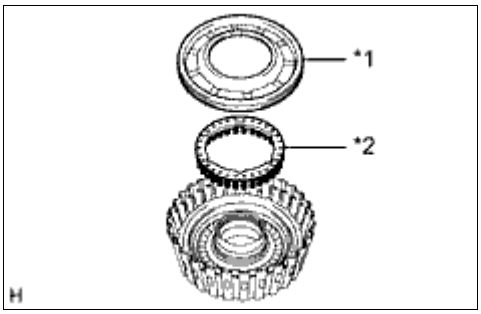


(b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070

(c) Remove the No. 2 clutch balancer and direct clutch return spring sub-assembly from the direct clutch drum sub-assembly.



Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly

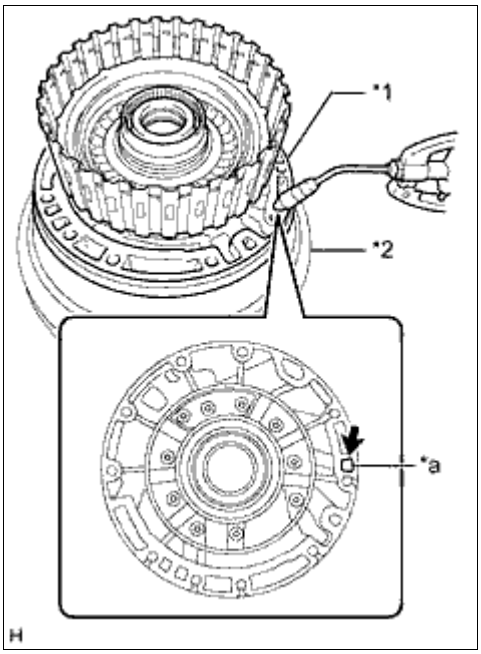
(d) Remove the O-ring from the No. 2 clutch balancer.

39. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

40. REMOVE DIRECT CLUTCH PISTON

cardiagn.com

(a) Place the oil pump assembly onto the torque converter assembly, and then place the direct clutch drum sub-assembly onto the oil pump assembly.



Text in Illustration

*1	Oil Pump Assembly
*2	Torque Converter Assembly
*a	Oil Hole

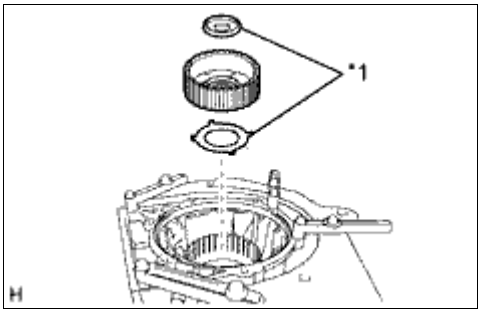
(b) While holding the direct clutch piston, apply compressed air to the oil hole of the oil pump assembly to remove the direct clutch piston from the direct clutch drum sub-assembly.

(c) Remove the 2 O-rings from the direct clutch piston.

41. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY INFO

42. REMOVE MULTIPLE DISC CLUTCH HUB

(a) Remove the multiple disc clutch hub from the automatic transmission case sub-assembly.



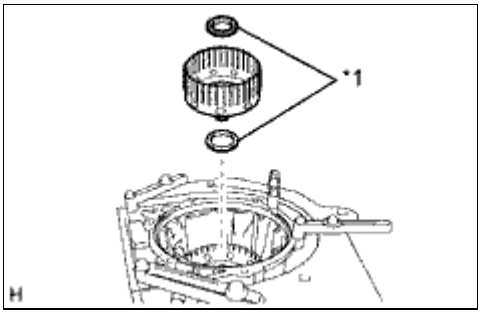
Text in Illustration

*1	Thrust Bearing Race

(b) Remove the 2 thrust bearing races from the multiple disc clutch hub.

43. REMOVE FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Remove the forward clutch hub sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

*1	Thrust Needle Roller Bearing

(b) Remove the 2 thrust needle roller bearings from the forward clutch hub sub-assembly.

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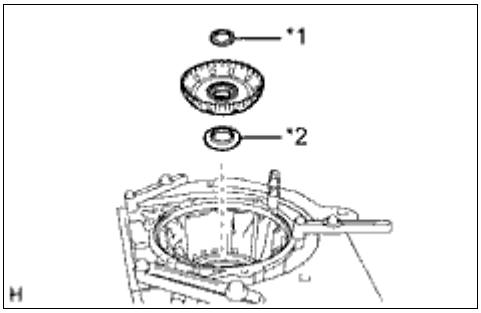
44. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY INFO

45. REMOVE SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Remove the sun gear input drum sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race
*2	Thrust Needle Roller Bearing



(b) Remove the thrust needle roller bearing and thrust bearing race from the sun gear input drum sub-assembly.

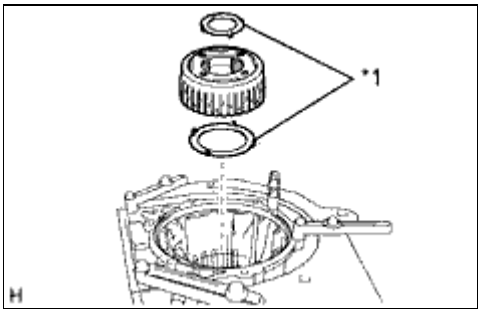
46. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY INFO

47. REMOVE FRONT PLANETARY GEAR ASSEMBLY

(a) Remove the front planetary gear assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race



(b) Remove the 2 thrust bearing races from the front planetary gear assembly.

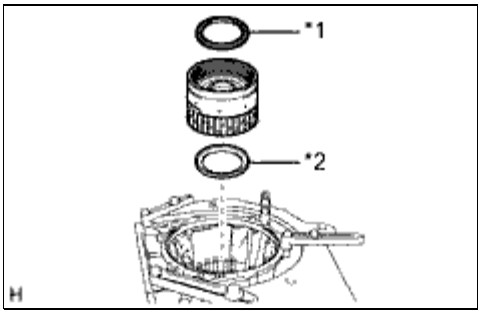
48. INSPECT FRONT PLANETARY GEAR ASSEMBLY INFO

49. REMOVE FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Remove the front planetary ring gear with front planetary ring gear flange sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race

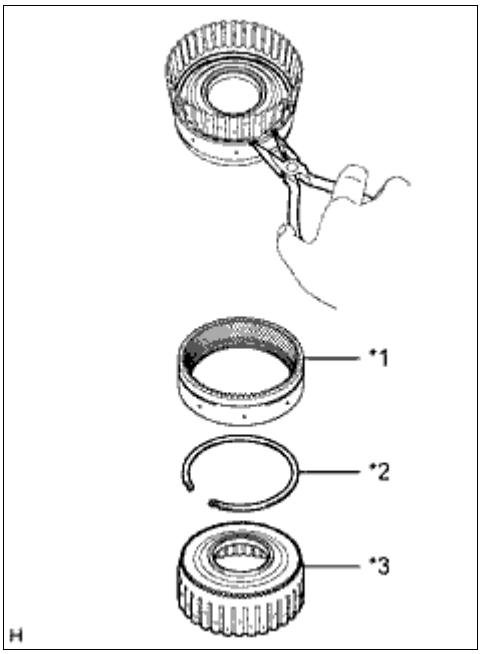


(b) Remove the thrust needle roller bearing and thrust bearing race from the front planetary ring gear with front planetary ring gear flange sub-assembly.

50. REMOVE FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

cardiagn.com

(a) Using needle-nose pliers, remove the snap ring and front planetary ring gear flange sub-assembly from the front planetary ring gear.



Text in Illustration

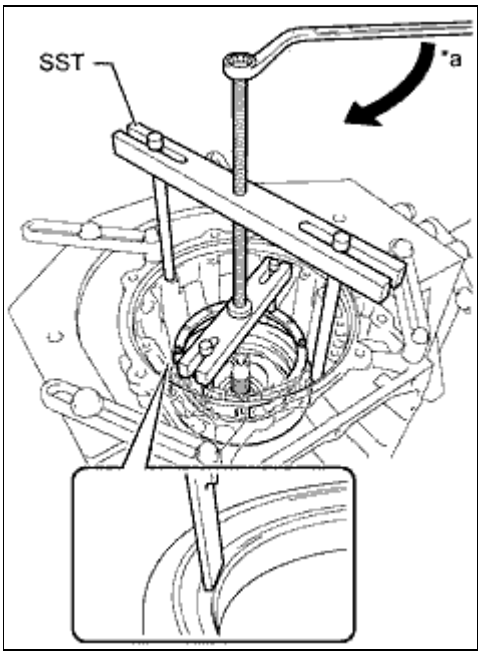
*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly

51. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

52. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

53. REMOVE NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06020
09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

NOTICE:

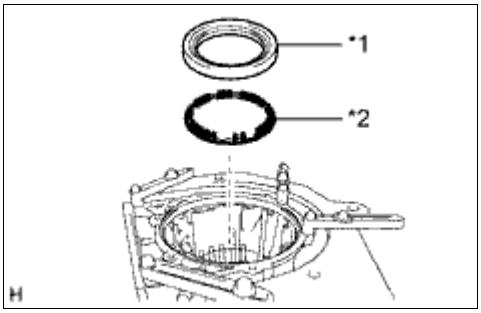
Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

cardiagn.com

(c) Remove the No. 2 brake cylinder with No. 2 brake piston and No. 2 brake piston return spring sub-assembly from the automatic transmission case sub-assembly.



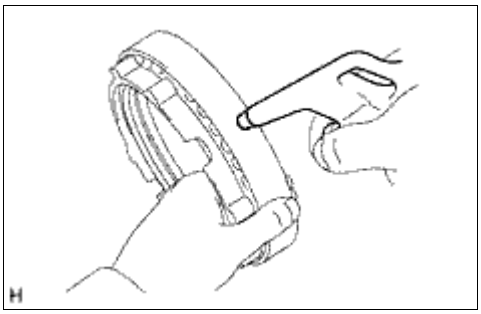
Text in Illustration

*1	No. 2 Brake Cylinder with No. 2 Brake Piston
*2	No. 2 Brake Piston Return Spring Sub-assembly

54. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

55. REMOVE NO. 2 BRAKE PISTON

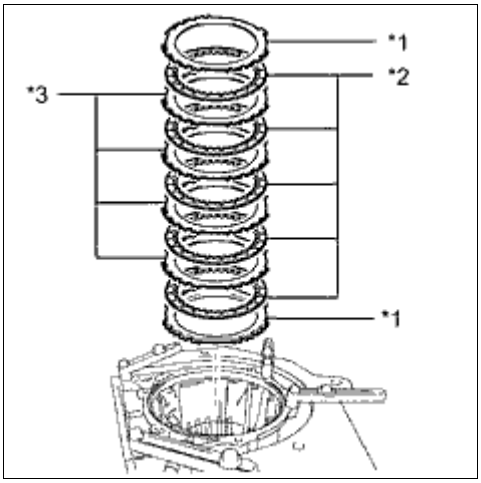
(a) While holding the No. 2 brake piston, apply compressed air to the oil hole of the No. 2 brake cylinder to remove the No. 2 brake piston from the No. 2 brake cylinder.



(b) Remove the 2 O-rings from the No. 2 brake piston.

56. REMOVE NO. 2 BRAKE DISC

(a) Remove the 2 No. 2 brake flanges, 5 No. 2 brake discs and 4 No. 2 brake plates from the automatic transmission case sub-assembly.



Text in Illustration

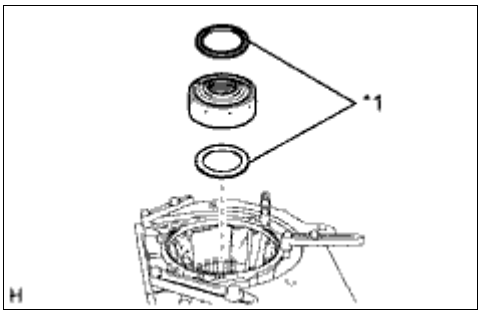
*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate

57. INSPECT NO. 2 BRAKE DISC INFO

58. REMOVE CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

cardiagn.com

(a) Remove the center planetary ring gear flange with center planetary ring gear from the automatic transmission case sub-assembly.



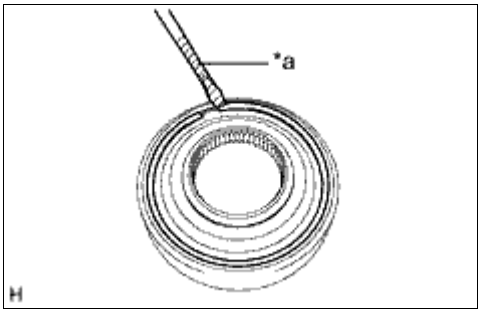
Text in Illustration

*1	Thrust Needle Roller Bearing

(b) Remove the 2 thrust needle roller bearings from the center planetary ring gear flange with center planetary ring gear.

59. REMOVE CENTER PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring from the center planetary ring gear flange with center planetary ring gear.



Text in Illustration

*a	Protective Tape

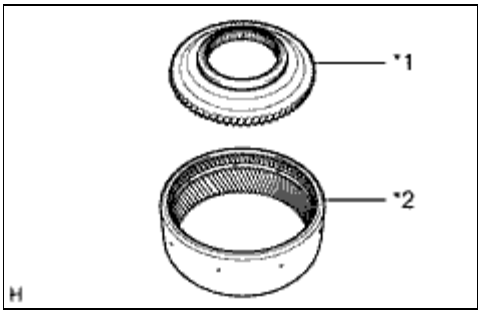
NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

HINT:

Tape the screwdriver tip before use.

(b) Remove the center planetary ring gear from the center planetary ring gear flange.

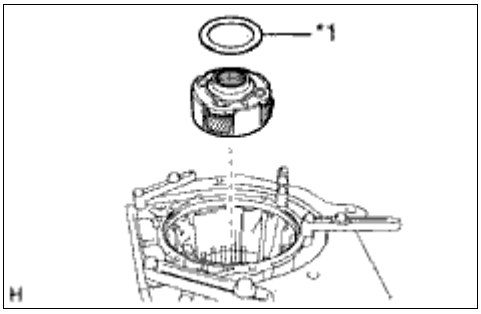


Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

60. REMOVE CENTER PLANETARY GEAR ASSEMBLY

(a) Remove the center planetary gear assembly from the automatic transmission case sub-assembly.



Text in Illustration

*1	Thrust Bearing Race

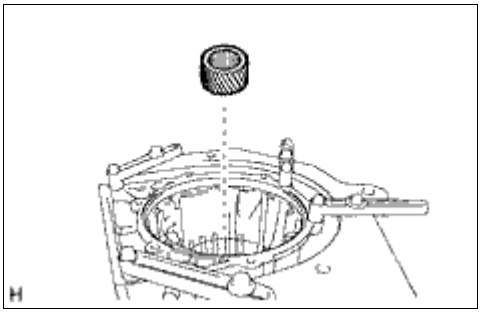
(b) Remove the thrust bearing race from the center planetary gear assembly.

cardiagn.com

61. INSPECT CENTER PLANETARY GEAR ASSEMBLY INFO

62. REMOVE PLANETARY SUN GEAR

(a) Remove the planetary sun gear from the automatic transmission case sub-assembly.



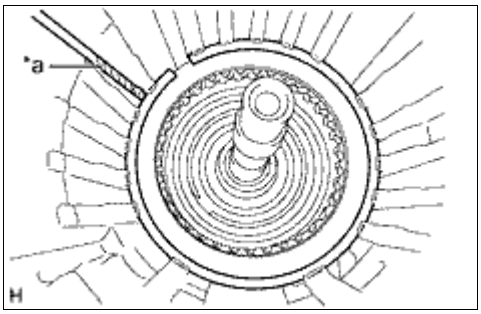
63. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

64. REMOVE NO. 1 BRAKE DISC

(a) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

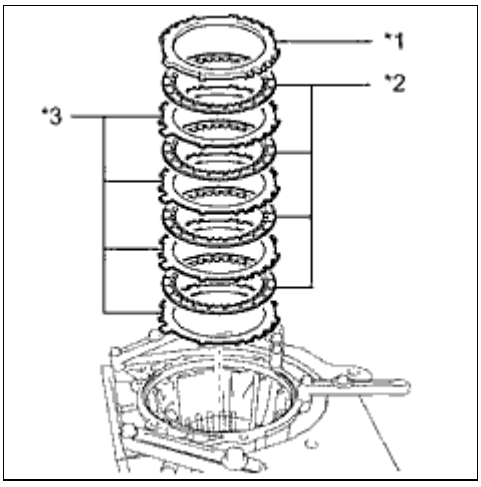
HINT:

Tape the screwdriver tip before use.

(b) Remove the No. 1 brake flange, 4 No. 1 brake discs and 4 No. 1 brake plates from the automatic transmission case sub-assembly.

Text in Illustration

*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

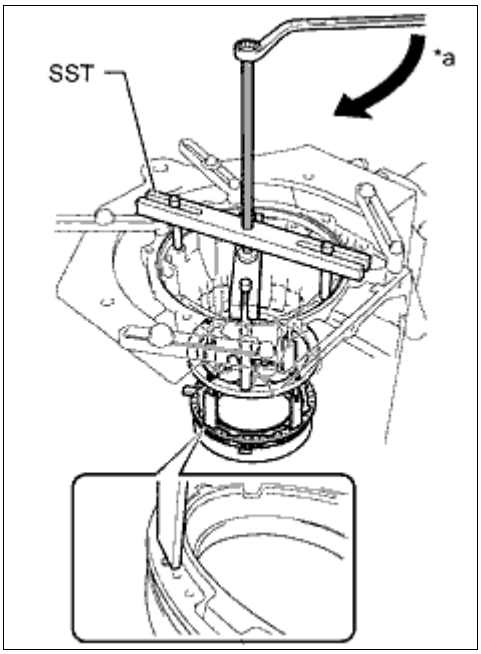


65. INSPECT NO. 1 BRAKE DISC INFO

66. REMOVE NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

cardiagn.com

(a) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06040
09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

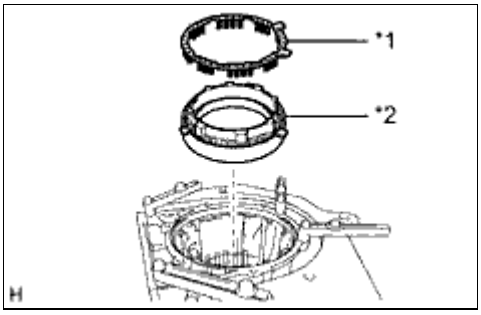
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(c) Remove the No. 1 brake piston return spring sub-assembly and No. 1 brake cylinder with No. 1 brake piston from the automatic transmission case sub-assembly.



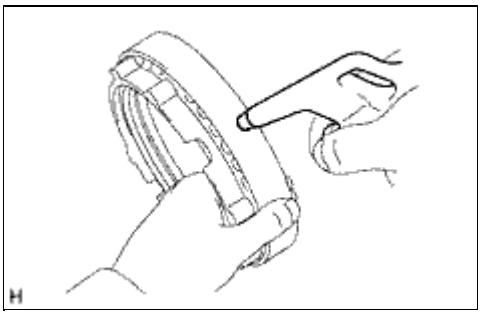
Text in Illustration

*1	No. 1 Brake Piston Return Spring Sub-assembly
*2	No. 1 Brake Cylinder with No. 1 Brake Piston

67. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

68. REMOVE NO. 1 BRAKE PISTON

(a) While holding the No. 1 brake piston, apply compressed air to the oil hole of the No. 1 brake cylinder to remove the No. 1 brake piston from the No. 1 brake cylinder.



(b) Remove the 2 O-rings from the No. 1 brake piston.

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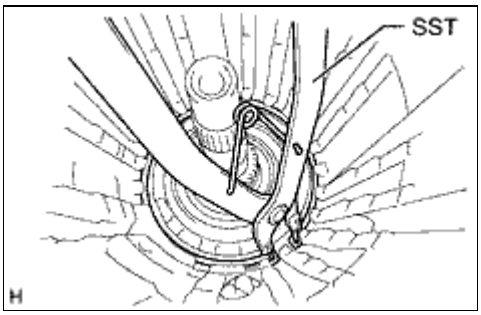
69. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

70. REMOVE INTERMEDIATE SHAFT WITH NO. 3 ONE-WAY CLUTCH ASSEMBLY AND REAR PLANETARY RING GEAR

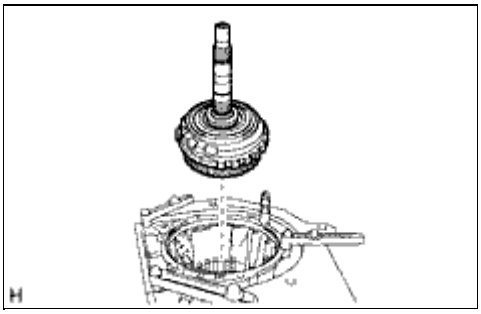
(a) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07060



(b) Remove the intermediate shaft with No. 3 one-way clutch assembly and rear planetary ring gear from the automatic transmission case sub-assembly.



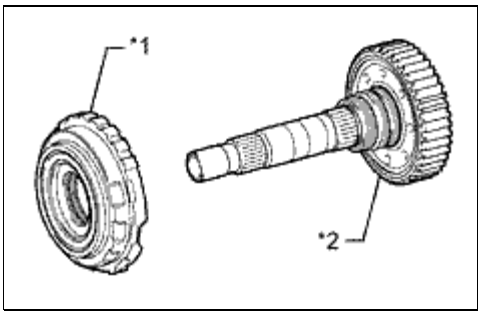
71. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY INFO

72. REMOVE NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Remove the No. 3 one-way clutch assembly with one-way clutch inner race from the intermediate shaft with rear planetary ring gear.

Text in Illustration

*1	No. 3 One-way Clutch Assembly with One-way Clutch Inner Race
*2	Intermediate Shaft with Rear Planetary Ring Gear

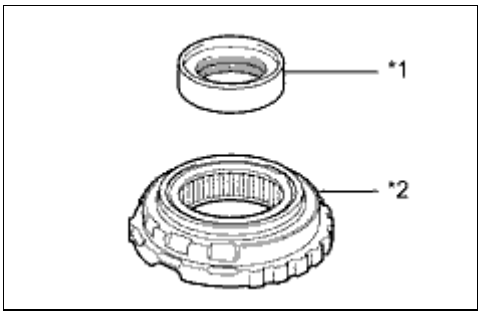


73. REMOVE ONE-WAY CLUTCH INNER RACE

(a) Remove the one-way clutch inner race from the No. 3 one-way clutch assembly.

Text in Illustration

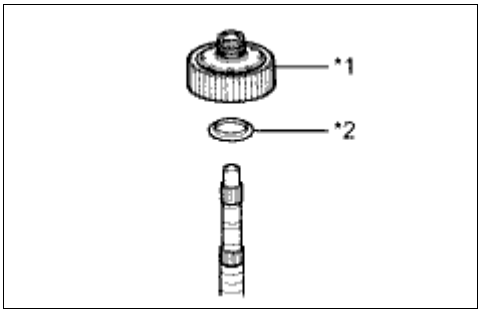
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly



74. REMOVE REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

cardiagn.com

(a) Remove the rear planetary ring gear flange sub-assembly with rear planetary ring gear from the intermediate shaft.

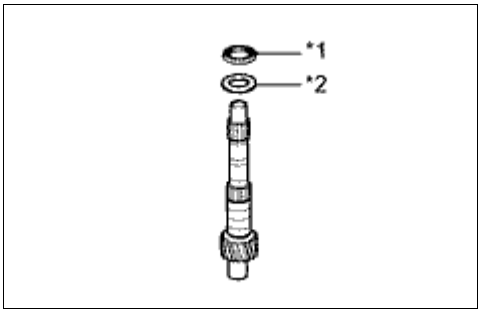


Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly with Rear Planetary Ring Gear
*2	Thrust Bearing Race

(b) Remove the thrust bearing race from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

(c) Remove the thrust needle roller bearing and thrust bearing race from the intermediate shaft.



Text in Illustration

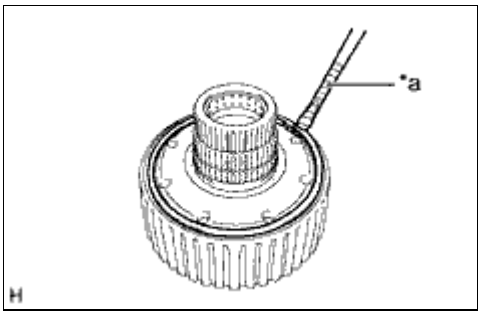
*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race

75. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

76. INSPECT INTERMEDIATE SHAFT INFO

77. REMOVE REAR PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

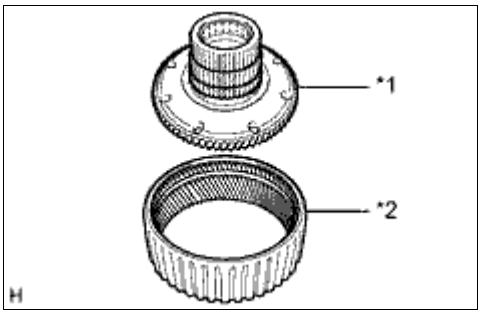
Tape the screwdriver tip before use.

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(b) Remove the rear planetary ring gear from the rear planetary ring gear flange sub-assembly.

Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

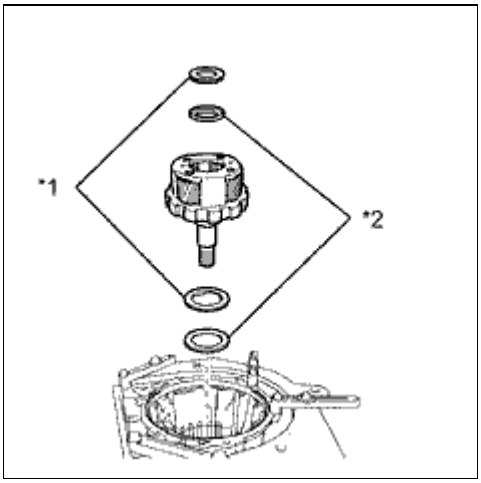


78. REMOVE REAR PLANETARY GEAR ASSEMBLY WITH NO. 4 BRAKE DISC

(a) Remove the rear planetary gear assembly with No. 4 brake disc from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race



(b) Remove the 2 thrust needle roller bearings and thrust bearing race from the rear planetary gear assembly with No. 4 brake disc.

(c) Remove the thrust bearing race from the automatic transmission case sub-assembly.

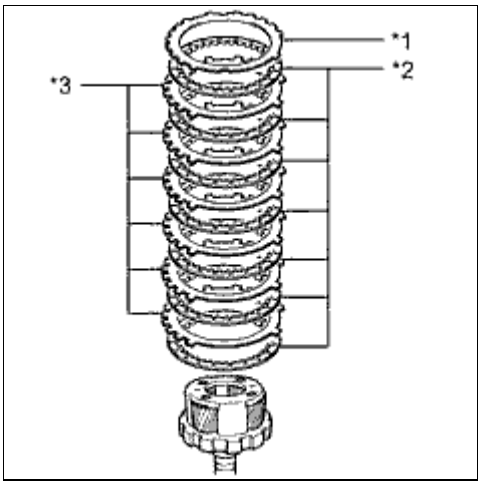
79. INSPECT REAR PLANETARY GEAR ASSEMBLY INFO

80. REMOVE NO. 4 BRAKE DISC

(a) Remove the No. 4 brake flange, 7 No. 4 brake discs and 6 No. 4 brake plates from the rear planetary gear assembly.

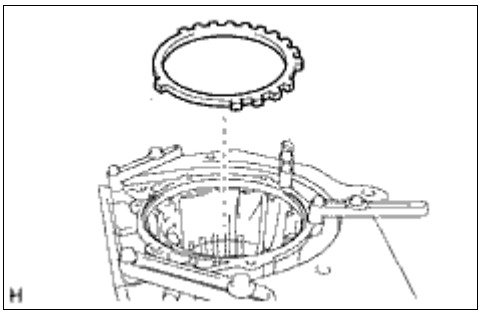
Text in Illustration

*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate



cardiagn.com

(b) Remove the No. 4 brake flange from the automatic transmission case sub-assembly.



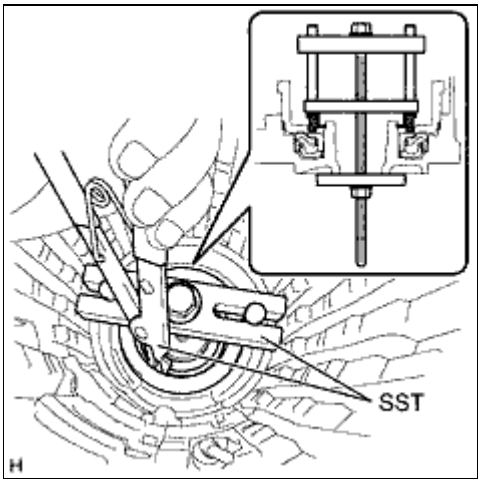
81. INSPECT NO. 4 BRAKE DISC INFO

82. REMOVE 1ST AND REVERSE BRAKE PISTON

(a) Place SST on the 1st and reverse brake return spring sub-assembly and compress the 1st and reverse brake return spring sub-assembly.

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

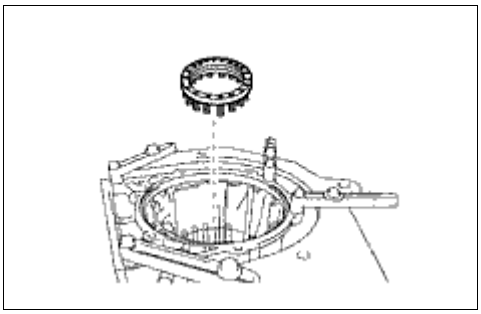


(b) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

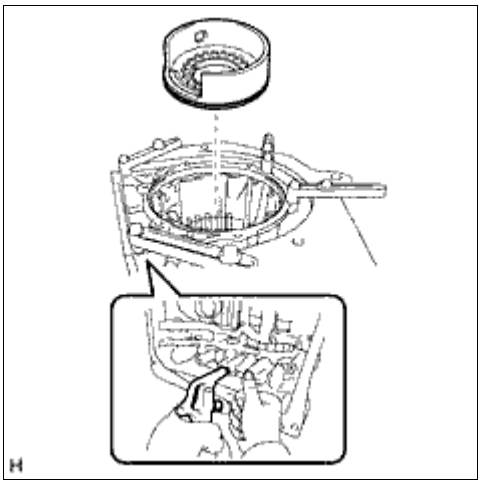
09350-07070

(c) Remove the 1st and reverse brake return spring sub-assembly from the automatic transmission case sub-assembly.



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(d) Apply compressed air to the oil hole of the automatic transmission case sub-assembly to remove the 1st and reverse brake piston from the automatic transmission case sub-assembly.



(e) Remove the O-ring from the 1st and reverse brake piston.

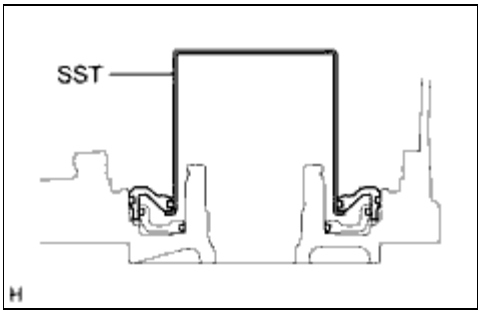
83. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY INFO

84. REMOVE BRAKE REACTION SLEEVE

(a) Using SST, remove the brake reaction sleeve from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07080



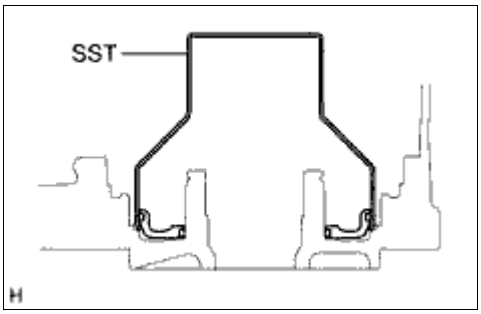
(b) Remove the 2 O-rings from the brake reaction sleeve.

85. REMOVE NO. 4 BRAKE PISTON

(a) Using SST, remove the No. 4 brake piston from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07090

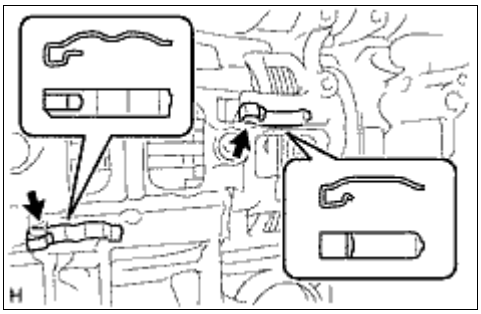


(b) Remove the 2 O-rings from the No. 4 brake piston.

86. REMOVE BRAKE PLATE STOPPER SPRING

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(a) Remove the 2 brake plate stopper springs from the automatic transmission case sub-assembly.



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000O9W056X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): INSPECTION; 2016 MY Tacoma [08/2015 -]		

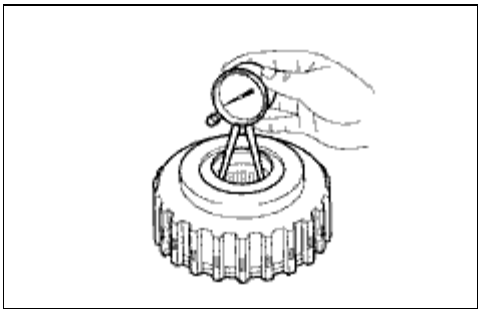
INSPECTION

1. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the direct clutch drum sub-assembly bushing.

Standard inside diameter:
59.515 to 59.540 mm (2.3432 to 2.3440 in.)

If the inside diameter is not as specified, replace the direct clutch drum sub-assembly.

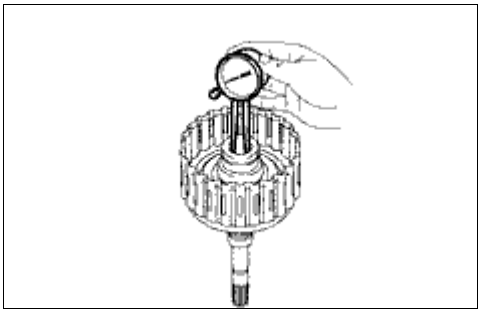


2. INSPECT INPUT SHAFT SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the input shaft sub-assembly bushing.

Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the input shaft sub-assembly.

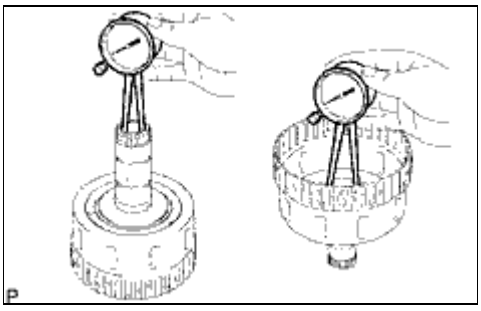


3. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the forward clutch hub sub-assembly bushing.

Standard inside diameter:
26.037 to 26.062 mm (1.0251 to 1.0260 in.)

If the inside diameter is not as specified, replace the forward clutch hub sub-assembly.



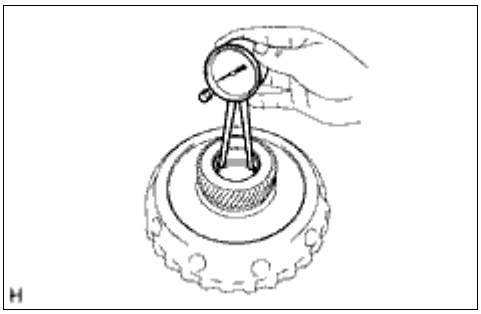
4. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY

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(a) Using a caliper gauge, measure the inside diameter of the sun gear input drum sub-assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the sun gear input drum sub-assembly.

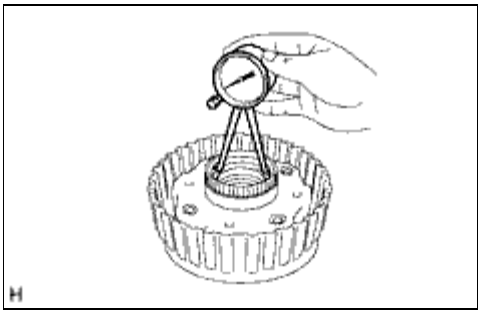


5. INSPECT FRONT PLANETARY GEAR ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary gear assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the front planetary gear assembly.

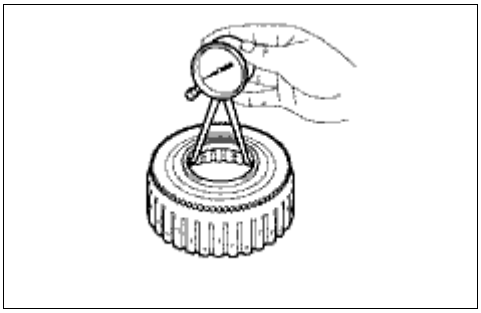


6. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
54.038 to 54.063 mm (2.1275 to 2.1284 in.)

If the inside diameter is not as specified, replace the front planetary ring gear flange sub-assembly.

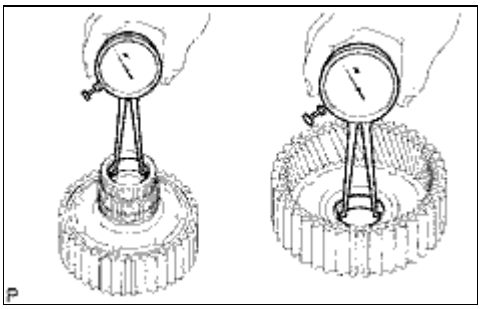


7. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the rear planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
32.176 to 32.201 mm (1.2668 to 1.2677 in.)

If the inside diameter is not as specified, replace the rear planetary ring gear flange sub-assembly.



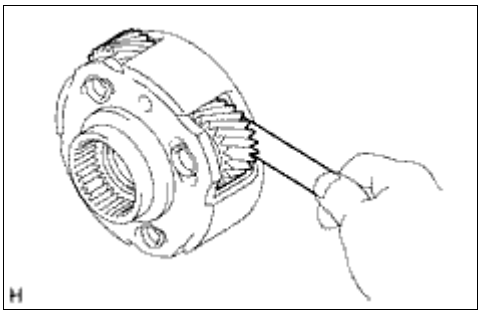
8. INSPECT CENTER PLANETARY GEAR ASSEMBLY

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(a) Using a feeler gauge, measure the center planetary gear pinion thrust clearance.

Standard clearance:
0.12 to 0.68 mm (0.00473 to 0.0267 in.)

If the clearance is not as specified, replace the center planetary gear assembly.

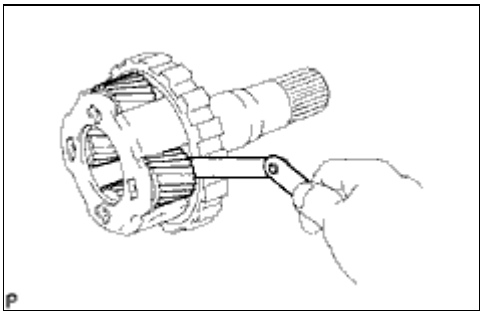


9. INSPECT REAR PLANETARY GEAR ASSEMBLY

(a) Using a feeler gauge, measure the rear planetary gear pinion thrust clearance.

Standard clearance:
0.2 to 0.6 mm (0.00788 to 0.0236 in.)

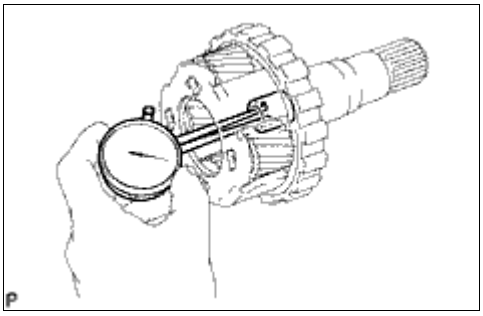
If the clearance is not as specified, replace the rear planetary gear assembly.



(b) Using a caliper gauge, measure the inside diameter of the rear planetary gear bushing.

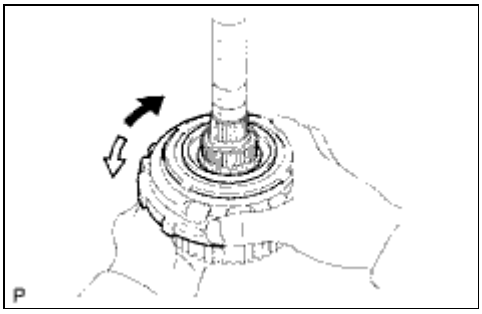
Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the rear planetary gear assembly.



10. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY

(a) Hold the rear planetary ring gear and turn the No. 3 one-way clutch assembly.



Text in Illustration

➡	Lock
⇨	Free

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(b) Check that the No. 3 one-way clutch assembly turns freely when turned counterclockwise and locks when turned clockwise.

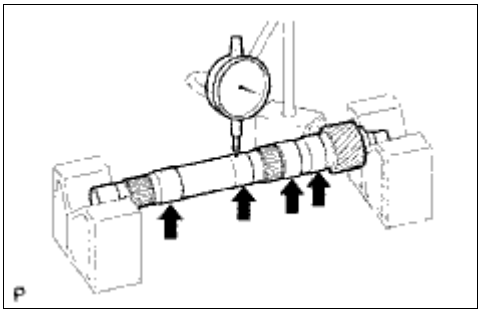
If there is a problem with the No. 3 one-way clutch assembly, replace it.

11. INSPECT INTERMEDIATE SHAFT

(a) Using a dial indicator and V-blocks, check the intermediate shaft runout.

Standard runout:
0.03 mm (0.00118 in.)

If the runout is more than the standard, replace the intermediate shaft with a new one.



(b) Using a micrometer, check the outer diameter of the intermediate shaft at each point shown in the illustration.

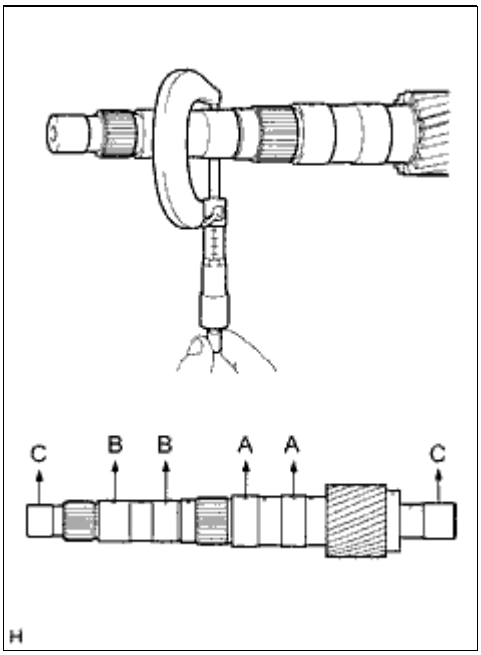
Standard diameter:

A
32.062 to 32.075 mm (1.2623 to 1.2627 in.)

B
25.962 to 25.975 mm (1.0222 to 1.0226 in.)

C
19.963 to 19.976 mm (0.7860 to 0.7864 in.)

If the outer diameter is more than the standard, replace the intermediate shaft with a new one.

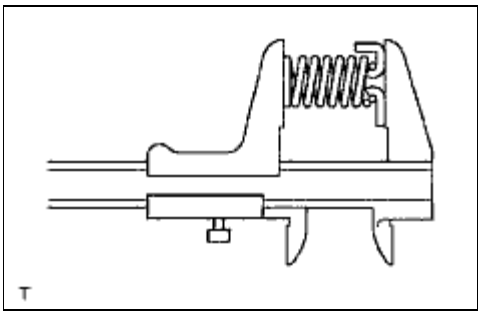


12. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the forward clutch return spring sub-assembly including the spring seat.

Standard free length:
26.74 mm (1.053 in.)

If the free length is more than the standard free length, replace the forward clutch return spring sub-assembly.



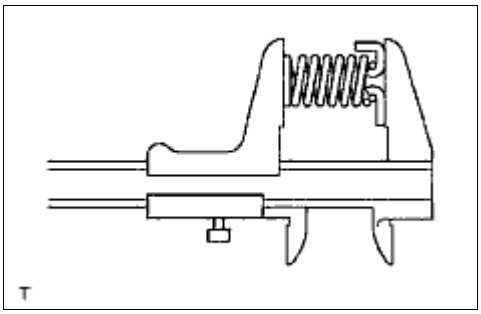
13. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY

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(a) Using a vernier caliper, measure the free length of the direct clutch return spring sub-assembly including the spring seat.

Standard free length:
22.14 mm (0.872 in.)

If the free length is more than the standard free length, replace the direct clutch return spring sub-assembly.

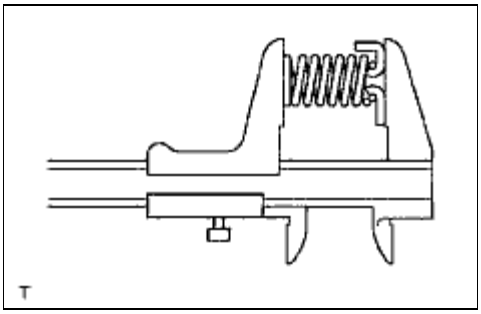


14. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 1 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.72 mm (0.658 in.)

If the free length is more than the standard free length, replace the No. 1 brake piston return spring sub-assembly.

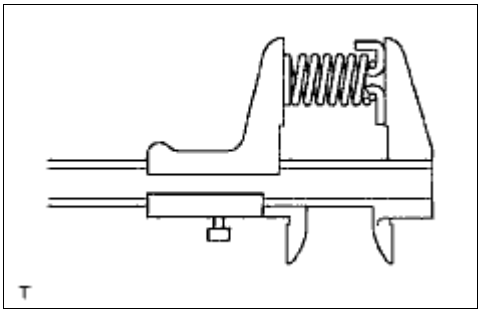


15. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 2 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.68 mm (0.657 in.)

If the free length is more than the standard free length, replace the No. 2 brake piston return spring sub-assembly.

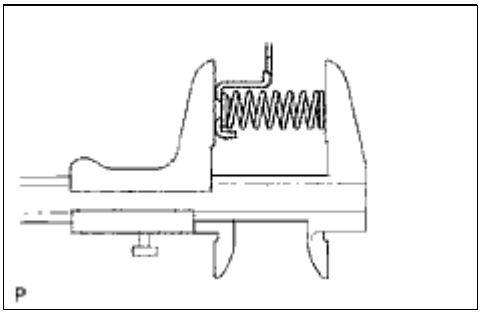


16. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the 1st and reverse brake return spring sub-assembly including the spring seat.

Standard free length:
23.74 mm (0.935 in.)

If the free length is more than the standard free length, replace the 1st and reverse return spring sub-assembly.

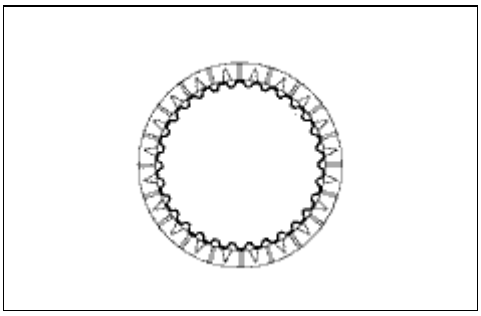


17. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

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(a) Check if the contact surfaces of the No. 1 clutch discs, No. 1 clutch plates and No. 1 clutch flange are worn or burnt.

If necessary, replace them.



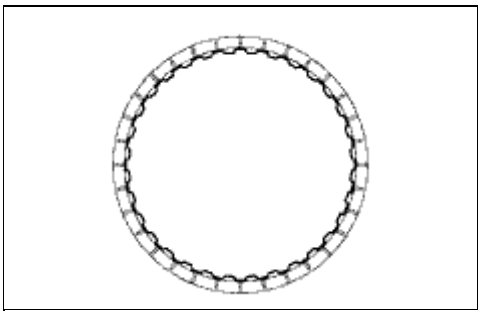
NOTICE:

- If the lining of any No. 1 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 clutch discs.
- Before installing new No. 1 clutch discs, soak them in ATF for at least 15 minutes.

18. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Check if the contact surfaces of the No. 2 clutch discs, No. 2 clutch plates and No. 2 clutch flange are worn or burnt.

If necessary, replace them.



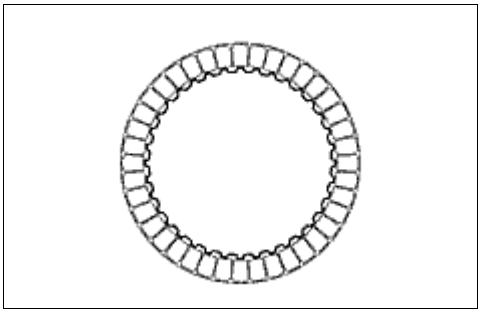
NOTICE:

- If the lining of any No. 2 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 clutch discs.
- Before installing new No. 2 clutch discs, soak them in ATF for at least 15 minutes.

19. INSPECT NO. 1 BRAKE DISC

(a) Check if the contact surfaces of the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are worn or burnt.

If necessary, replace them.



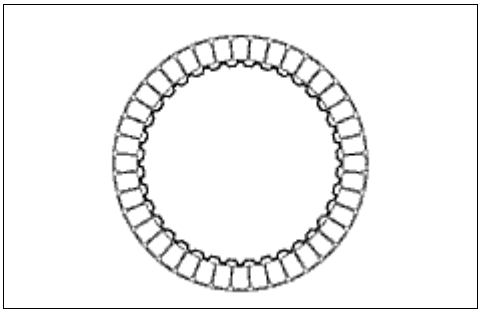
NOTICE:

- If the lining of any No. 1 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 brake discs.
- Before installing new No. 1 brake discs, soak them in ATF for at least 15 minutes.

20. INSPECT NO. 2 BRAKE DISC

(a) Check if the contact surfaces of the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

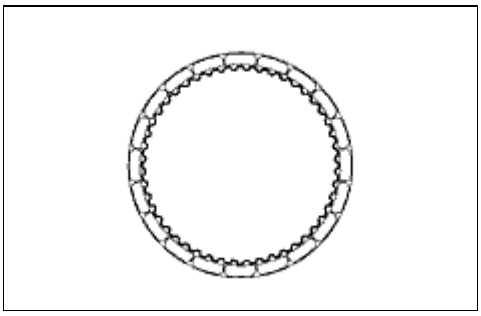
- If the lining of any No. 2 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 brake discs.
- Before installing new No. 2 brake discs, soak them in ATF for at least 15 minutes.

21. INSPECT NO. 4 BRAKE DISC

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(a) Check if the contact surfaces of the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

- If the lining of any No. 4 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 4 brake discs.
- Before installing new No. 4 brake discs, soak them in ATF for at least 15 minutes.

22. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH)

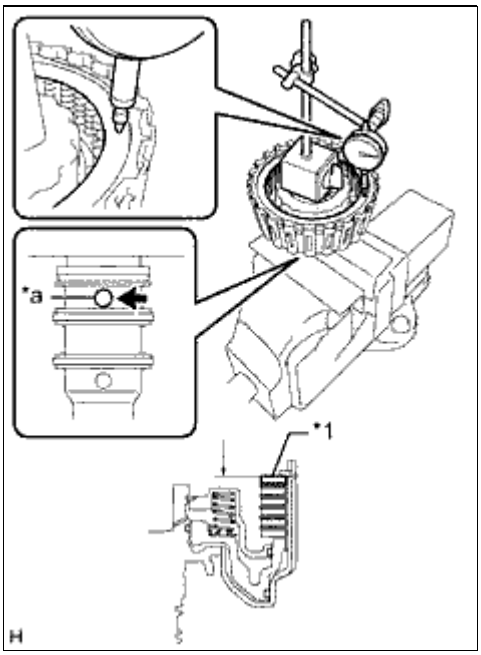
(a) Using a dial indicator, measure the clearance of the No. 1 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Forward Clutch Flange
*a	Oil Hole

Standard clearance:
0.75 to 1.05 mm (0.0296 to 0.0413 in.)

If the clearance is not as specified, select and install an appropriate forward clutch flange that will bring the clearance within the specified range.



HINT:

There are forward clutch flanges of different thicknesses.

Forward Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35635-04010	3.0 (0.118)
35635-04020	3.1 (0.122)
35635-04030	3.2 (0.126)
35635-04040	3.3 (0.130)
35635-04050	3.4 (0.134)
35635-04060	3.5 (0.138)
35635-04070	3.6 (0.142)
35635-04080	3.7 (0.146)
35635-04090	3.8 (0.150)
35635-04100	3.9 (0.154)
35635-04110	4.0 (0.157)

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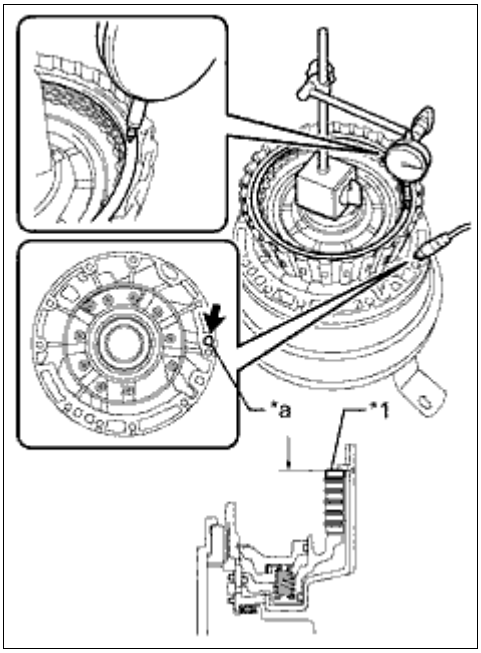
PART NO.	THICKNESS (MM (IN.))
35635-04120	4.1 (0.161)
35635-04130	4.2 (0.165)

23. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH)

(a) Using a dial indicator, measure the clearance of the No. 2 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Direct Clutch Flange
*a	Oil Hole



Standard clearance:
0.5 to 0.8 mm (0.0197 to 0.0314 in.)

If the clearance is not as specified, select and install an appropriate direct clutch flange that will bring the clearance within the specified range.

HINT:

There are direct clutch flanges of different thicknesses.

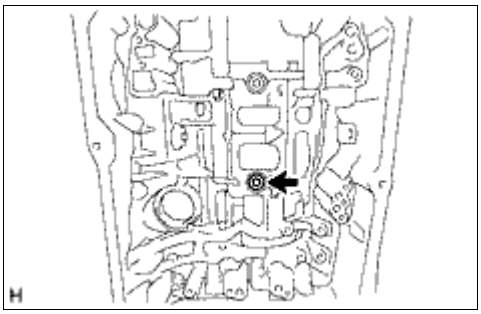
Direct Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35675-04010	3.0 (0.118)
35675-04020	3.1 (0.122)
35675-04030	3.2 (0.126)
35675-04040	3.3 (0.130)
35675-04050	3.4 (0.134)
35675-04060	3.5 (0.138)
35675-04070	3.6 (0.142)
35675-04080	3.7 (0.146)
35675-04090	3.8 (0.150)

24. INSPECT CLEARANCE OF NO. 1 BRAKE

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(a) Make sure that the No. 1 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



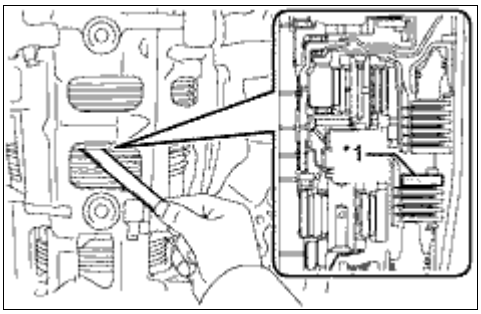
(b) Using a feeler gauge, measure the No. 1 brake pack clearance between the No. 1 brake disc and No. 1 brake flange.

Text in Illustration

*1	Selected No. 1 Brake Flange

Standard clearance:
0.4 to 0.7 mm (0.0158 to 0.0275 in.)

If the clearance is not as specified, select and install an appropriate No. 1 brake flange that will bring the clearance within the specified range.



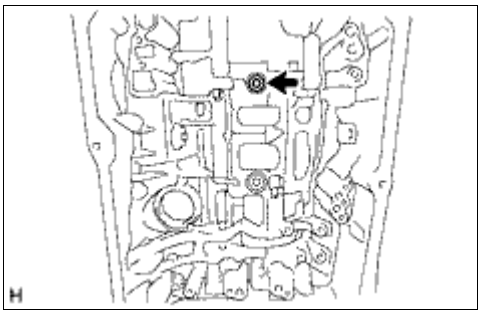
No. 1 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	4.9 (0.193)
1	5.0 (0.197)
2	5.1 (0.201)
3	5.2 (0.205)
4	5.3 (0.209)
5	5.4 (0.213)
6	5.5 (0.217)
7	5.6 (0.220)
8	5.7 (0.224)
A	5.8 (0.228)

25. INSPECT CLEARANCE OF NO. 2 BRAKE

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(a) Make sure that the No. 2 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



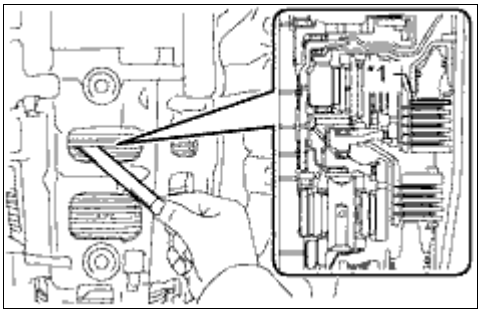
(b) Using a feeler gauge, measure the No. 2 brake pack clearance between the No. 2 brake disc and No. 2 brake flange.

Text in Illustration

*1	Selected No. 2 Brake Flange

Standard clearance:
0.5 to 0.8 mm (0.0197 to 0.0314 in.)

If the clearance is not as specified, select and install an appropriate No. 2 brake flange that will bring the clearance within the specified range.

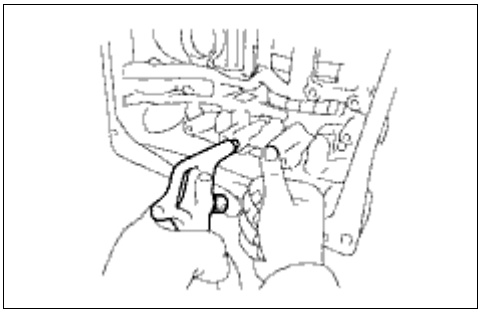


No. 2 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	2.0 (0.0787)
1	2.1 (0.0827)
2	2.2 (0.0866)
3	2.3 (0.0906)
4	2.4 (0.0945)
5	2.5 (0.0984)
6	2.6 (0.102)
7	2.7 (0.106)
8	2.8 (0.110)

26. INSPECT CLEARANCE OF NO. 4 BRAKE

(a) Make sure that the 1st and reverse brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



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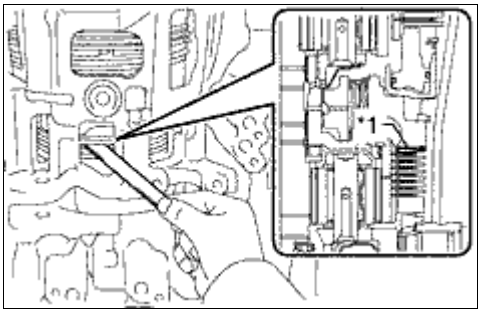
(b) Using a feeler gauge, measure the No. 4 brake pack clearance between the No. 4 brake disc and No. 4 brake flange.

Text in Illustration

*1	Selected No. 4 Brake Flange

Standard clearance:
0.7 to 1.0 mm (0.0276 to 0.0393 in.)

If the clearance is not as specified, select and install an appropriate No. 4 brake flange that will bring the clearance within the specified range.



No. 4 Brake Flange Thickness:

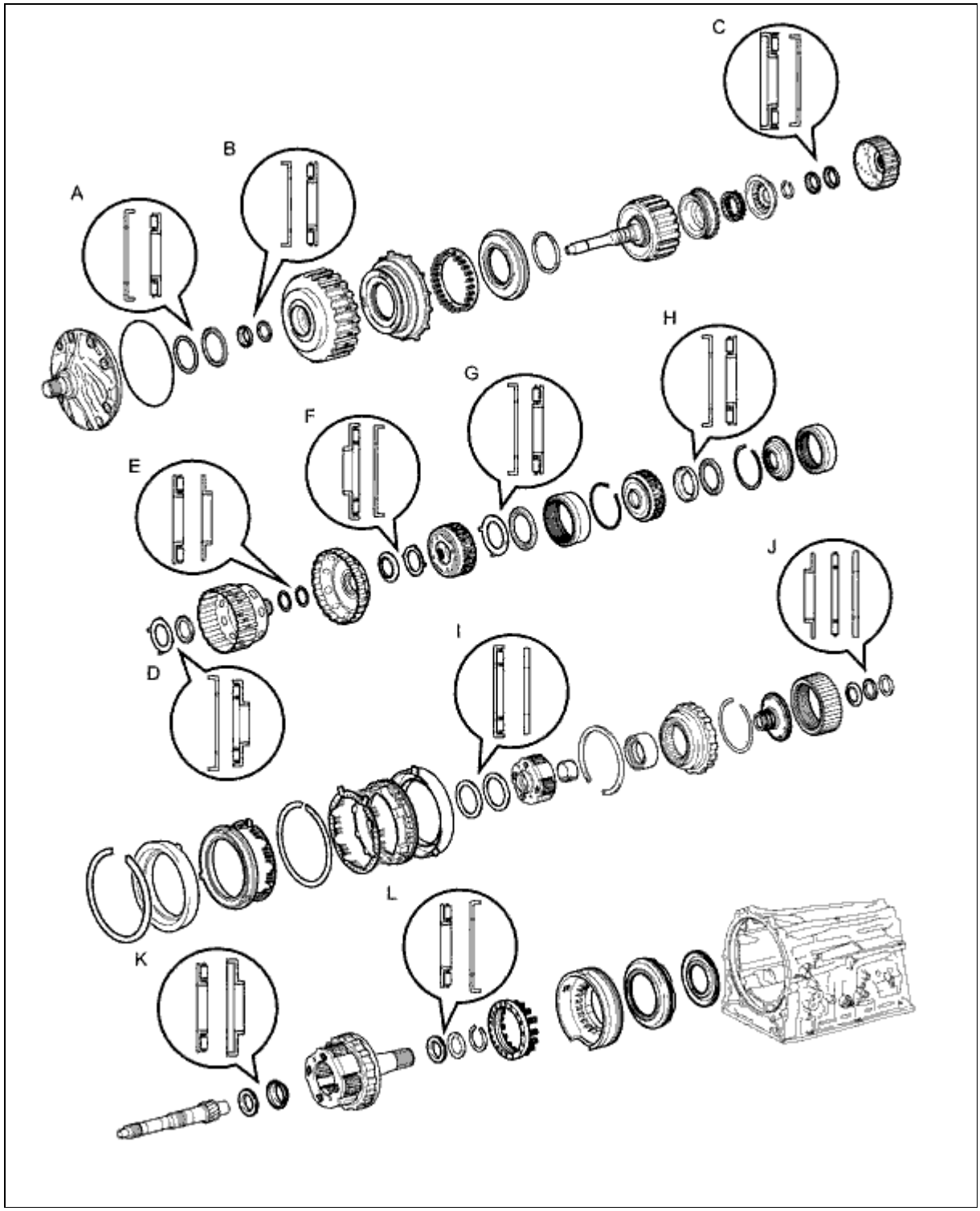
MARK	THICKNESS (MM (IN.))
0	1.8 (0.0709)
2	2.0 (0.0787)
4	2.2 (0.0866)
6	2.4 (0.0945)
8	2.6 (0.102)
10	2.8 (0.110)
12	3.0 (0.118)
14	3.2 (0.126)

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA0051X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2GR-FKS): REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. BEARING POSITION

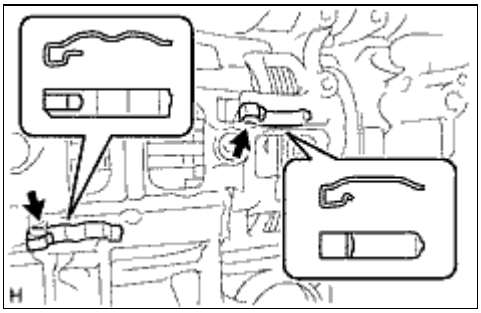


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MARK	FRONT RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))	THRUST BEARING DIAMETER INSIDE / OUTSIDE (MM (IN.))	REAR RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))
A	74.2 (2.921) / 87.74 (3.454)	71.9 (2.831) / 85.6 (3.370)	-
B	40.0 (1.575) / 52.8 (2.079)	34.6 (1.362) / 52.0 (2.047)	-
C	22.0 (0.866) / 44.8 (1.764)	21.3 (0.839) / 41.1 (1.618)	-
D	38.4 (1.512) / 56.5 (2.224)	33.3 (1.311) / 56.6 (2.228)	-
E	-	40.83 (1.607) / 52.8 (2.079)	39.6 (1.559) / 52.8 (2.079)
F	-	37.1 (1.461) / 61.2 (2.409)	44.0 (1.732) / 62.8 (2.472)
G	65.8 (2.591) / 86.3 (3.398)	63.3 (2.492) / 78.8 (3.102)	-
H	66.3 (2.610) / 78.9 (3.106)	63.3 (2.492) / 78.8 (3.102)	-
I	-	55.7 (2.193) / 76.4 (3.008)	53.7 (2.114) / 74.0 (2.913)
J	33.4 (1.315) / 49.0 (1.929)	32.1 (1.264) / 49.35 (1.943)	32.1 (1.264) / 49.0 (1.929)
K	-	21.0 (0.827) / 41.5 (1.634)	23.13 (0.911) / 41.5 (1.634)
L	-	43.55 (1.715) / 61.0 (2.402)	47.1 (1.854) / 67.1 (2.642)

2. INSTALL BRAKE PLATE STOPPER SPRING

(a) Install the 2 brake plate stopper springs to the automatic transmission case sub-assembly.



NOTICE:

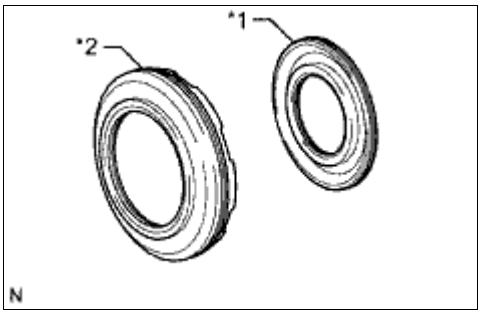
The shapes of the parts are different. Refer to the illustration when installing the parts.

3. INSTALL NO. 4 BRAKE PISTON

(a) Coat 2 new O-rings with ATF, and install them to the brake reaction sleeve.

(b) Coat 2 new O-rings with ATF, and install them to the No. 4 brake piston.

(c) Install the No. 4 brake piston to the brake reaction sleeve.



Text in Illustration

*1	No. 4 Brake Piston
*2	Brake Reaction Sleeve

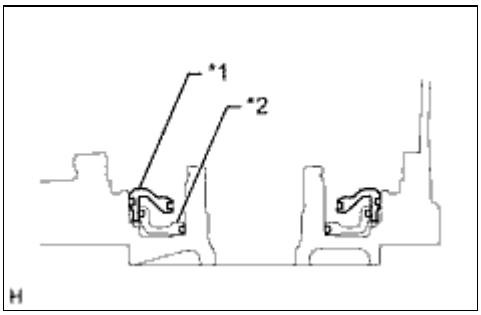
NOTICE:

Be careful not to damage the O-rings.

4. INSTALL BRAKE REACTION SLEEVE

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(a) With the No. 4 brake piston underneath (the rear side), install the brake reaction sleeve and No. 4 brake piston to the automatic transmission case sub-assembly.



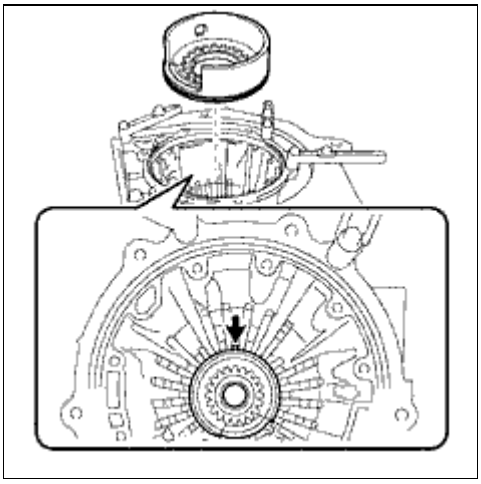
Text in Illustration

*1	Brake Reaction Sleeve
*2	No. 4 Brake Piston

NOTICE:

Be careful not to damage the O-rings.

5. INSTALL 1ST AND REVERSE BRAKE PISTON

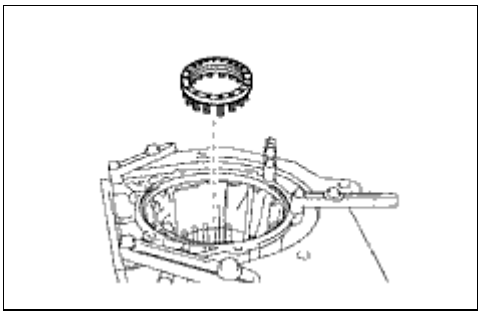


(a) Coat a new O-ring with ATF, and install it to the 1st and reverse brake piston.

(b) Install the 1st and reverse brake piston to the automatic transmission case sub-assembly while making sure that the protrusion of the 1st and reverse brake piston is positioned as shown in the illustration.

NOTICE:

Be careful not to damage the O-ring.

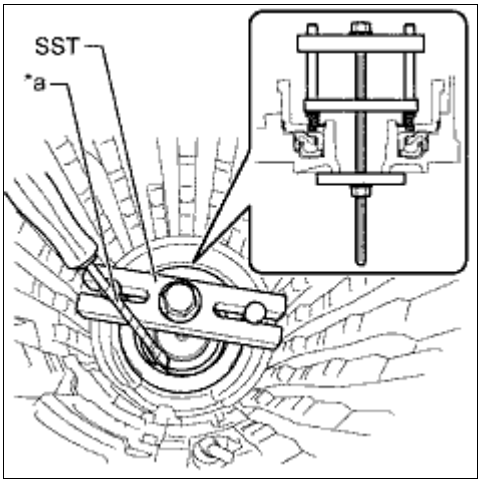


(c) Install the 1st and reverse brake return spring sub-assembly to the automatic transmission case sub-assembly.

(d) Place the 1st and reverse brake return spring sub-assembly onto the 1st and reverse brake piston.

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(e) Place SST on the 1st and reverse brake return spring sub-assembly, and compress the 1st and reverse brake return spring sub-assembly.



Text in Illustration

*a	Protective Tape

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

(f) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the 1st and reverse brake return spring sub-assembly and automatic transmission case sub-assembly.

HINT:

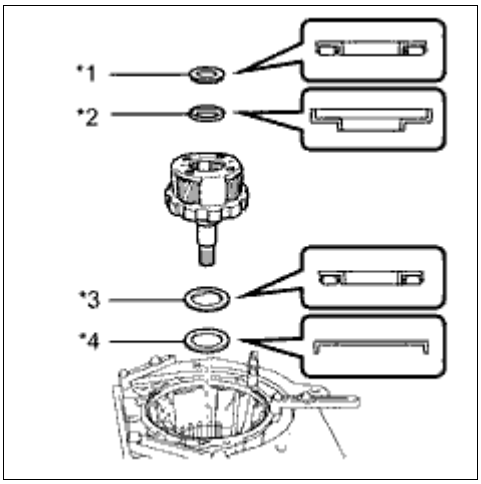
Tape the screwdriver tip before use.

6. INSTALL REAR PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing K
*2	Thrust Bearing Race K
*3	Thrust Needle Roller Bearing L
*4	Thrust Bearing Race L



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing K	21.0 (0.827)	41.5 (1.634)
Thrust Bearing Race K	23.13 (0.911)	41.5 (1.634)
Thrust Needle Roller Bearing L	43.55 (1.715)	61.0 (2.402)
Thrust Bearing Race L	47.1 (1.854)	67.1 (2.642)

NOTICE:

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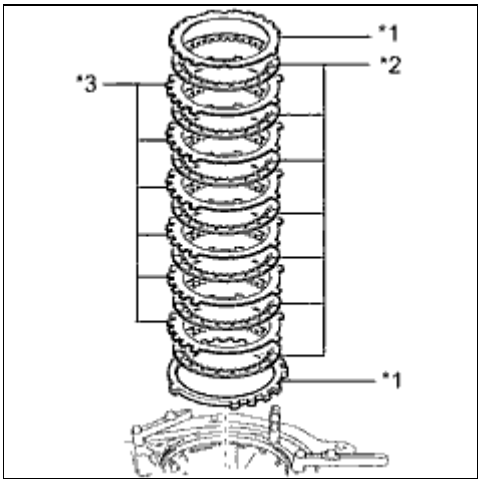
Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Coat the 2 thrust needle roller bearings and thrust bearing race with ATF and install them to the rear planetary gear assembly.

(c) Install the rear planetary gear assembly to the automatic transmission case sub-assembly.

7. INSTALL NO. 4 BRAKE DISC

(a) Install the 2 No. 4 brake flanges, 7 No. 4 brake discs and 6 No. 4 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

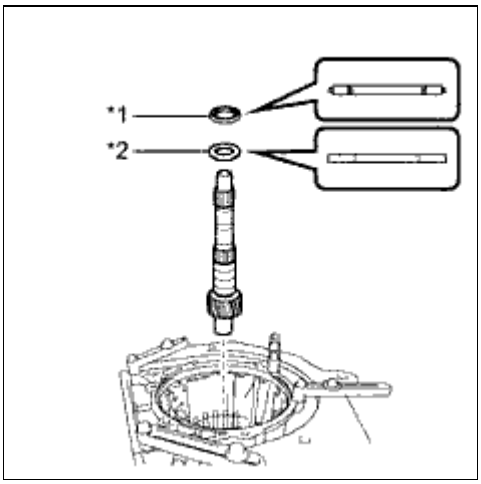
*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate

NOTICE:

- Make sure that the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are installed in the correct order.
- Install the thicker No. 4 brake flange first, and then install the thinner one.

8. INSTALL INTERMEDIATE SHAFT

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the intermediate shaft.



Text in Illustration

*1	Thrust Needle Roller Bearing J
*2	Thrust Bearing Race J (Rear Race)

Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

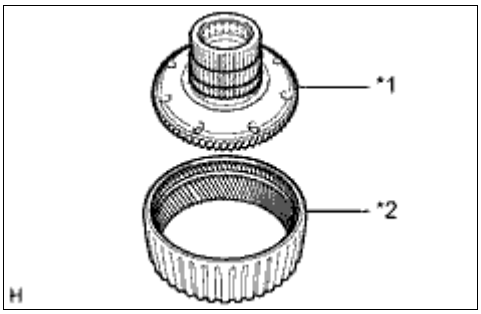
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing J	32.1 (1.264)	49.35 (1.943)
Thrust Bearing Race J (Rear Race)	32.1 (1.264)	49.0 (1.929)

(b) Install the intermediate shaft to the automatic transmission case sub-assembly.

9. INSTALL REAR PLANETARY RING GEAR

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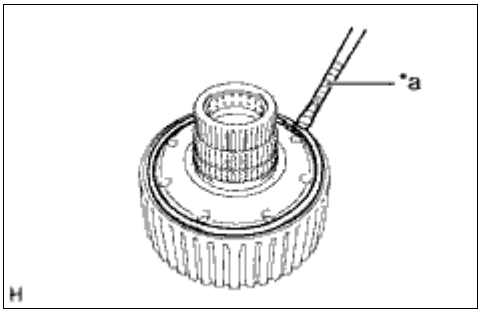
(a) Install the rear planetary ring gear to the rear planetary ring gear flange sub-assembly.



Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

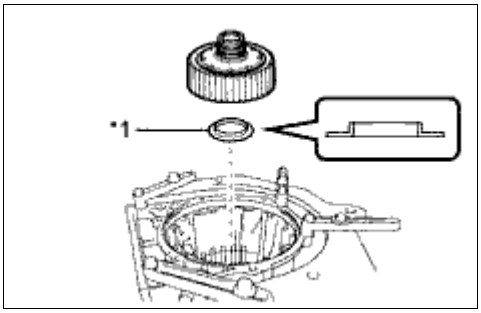
Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

Tape the screwdriver tip before use.

10. INSTALL REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

(a) Coat the thrust bearing race with ATF and install it to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*1	Thrust Bearing Race J (Front Race)

Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race J (Front Race)	33.4 (1.315.)	49.0 (1.929)

NOTICE:

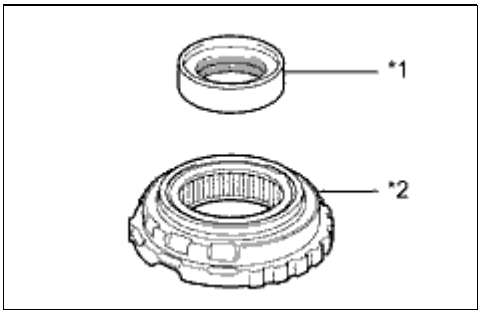
Be sure to install the thrust bearing race in the correct direction.

(b) Install the rear planetary ring gear flange sub-assembly with rear planetary ring gear to the automatic transmission case sub-assembly.

11. INSTALL ONE-WAY CLUTCH INNER RACE

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(a) Install the one-way clutch inner race to the No. 3 one-way clutch assembly.



Text in Illustration

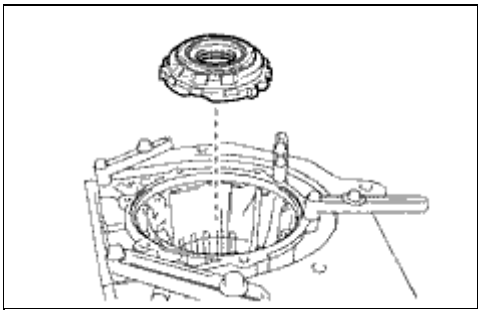
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly

HINT:

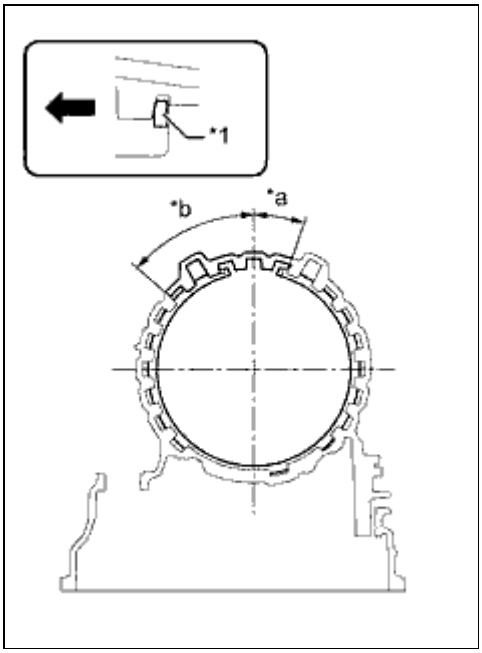
Rotate the one-way clutch inner race clockwise to install it.

12. INSTALL NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Install the No. 3 one-way clutch assembly with one-way clutch inner race to the automatic transmission case sub-assembly.



(b) Using SST, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*1	Snap Ring
*a	19°
*b	49°
➡	Front Side

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SST: 09350-30020

09350-07060

NOTICE:

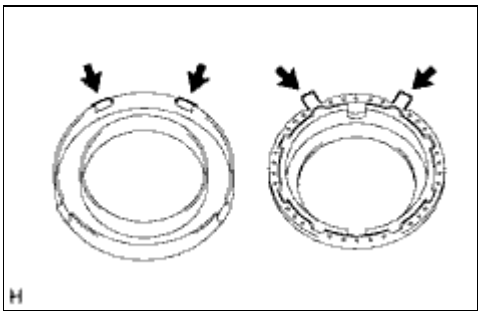
- Install the snap ring so that the tapered side is facing out.
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.

13. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

14. INSTALL NO. 1 BRAKE PISTON

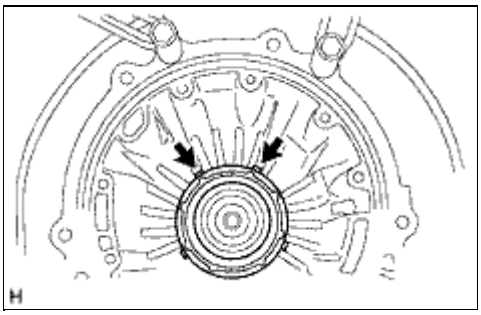
(a) Coat 2 new O-rings with ATF and install them to the No. 1 brake piston.

(b) With the No. 1 brake piston return spring sub-assembly installed to the No. 1 brake piston, align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston to the No. 1 brake cylinder.



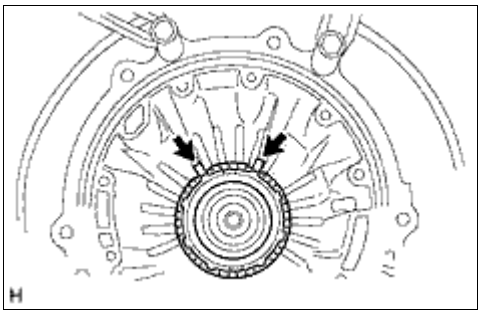
15. INSTALL NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

(a) Install the No. 1 brake cylinder with No. 1 brake piston to the automatic transmission case sub-assembly while making sure that the 2 claws of the No. 1 brake cylinder with No. 1 brake piston are positioned as shown in the illustration.



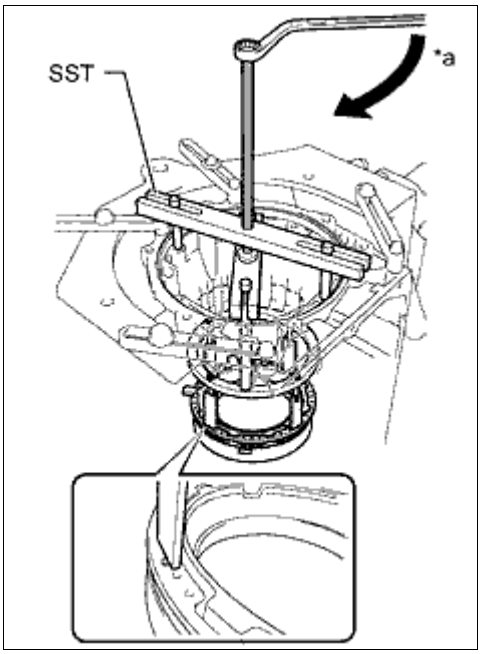
16. INSTALL NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston return spring sub-assembly to the No. 1 brake piston.



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(b) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



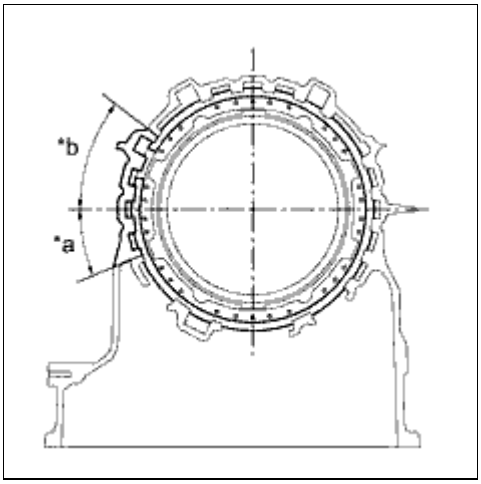
Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06040
09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(c) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

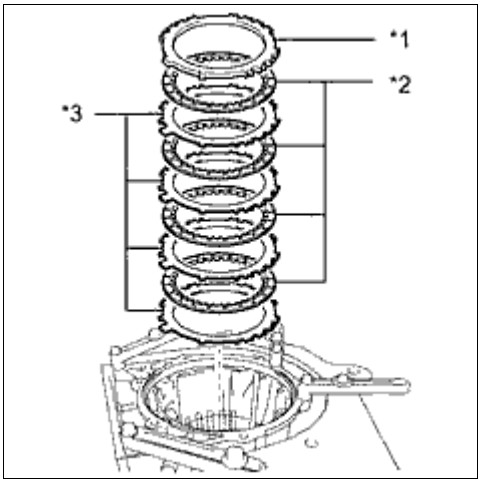
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

17. INSTALL NO. 1 BRAKE DISC

(a) Install the No. 1 brake flange, 4 No. 1 brake discs and 4 No. 1 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

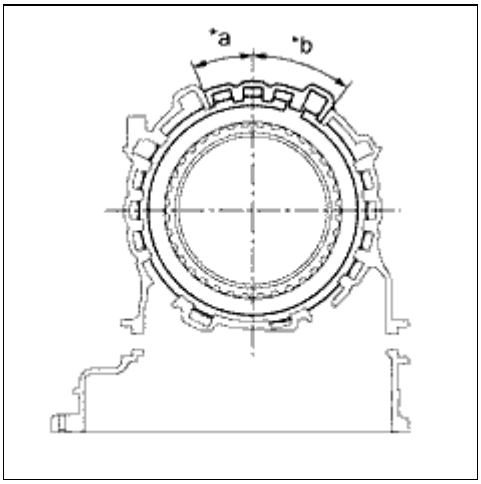
*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

NOTICE:

Make sure that the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are installed in the correct order.

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(b) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

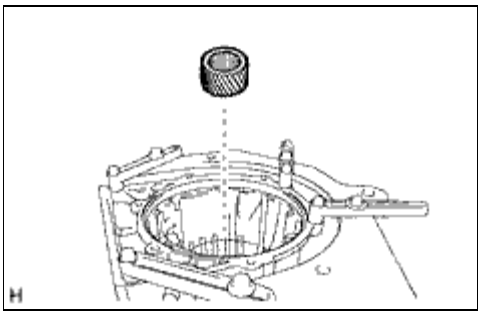
HINT:

Tape the screwdriver tip before use.

18. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

19. INSTALL PLANETARY SUN GEAR

(a) Install the planetary sun gear to the automatic transmission case sub-assembly.

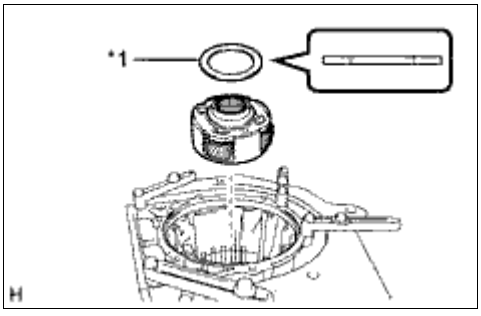


20. INSTALL CENTER PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the center planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race I



Thrust Bearing Race Diameter:

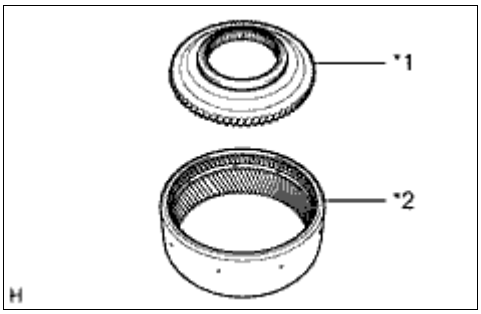
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race I	53.7 (2.114)	74.0 (2.913)

(b) Install the center planetary gear assembly to the automatic transmission case sub-assembly.

21. INSTALL CENTER PLANETARY RING GEAR

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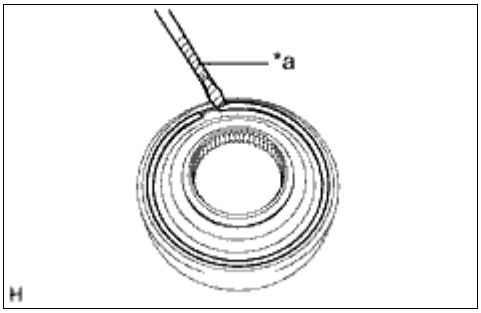
(a) Install the center planetary ring gear to the center planetary ring gear flange.



Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the center planetary ring gear flange with center planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

HINT:

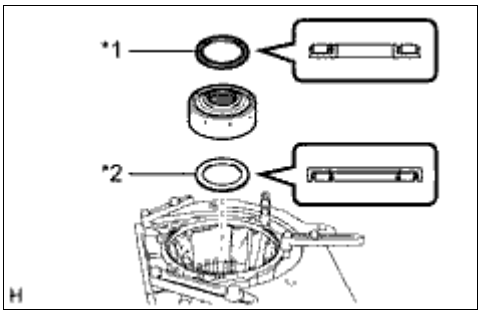
Tape the screwdriver tip before use.

22. INSTALL CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

(a) Coat the 2 thrust needle roller bearings with ATF and install them to the center planetary ring gear flange with center planetary ring gear.

Text in Illustration

*1	Thrust Needle Roller Bearing H
*2	Thrust Needle Roller Bearing I



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing H	63.3 (2.492)	78.8 (3.102)
Thrust Needle Roller Bearing I	55.7 (2.193)	76.4 (3.008)

NOTICE:

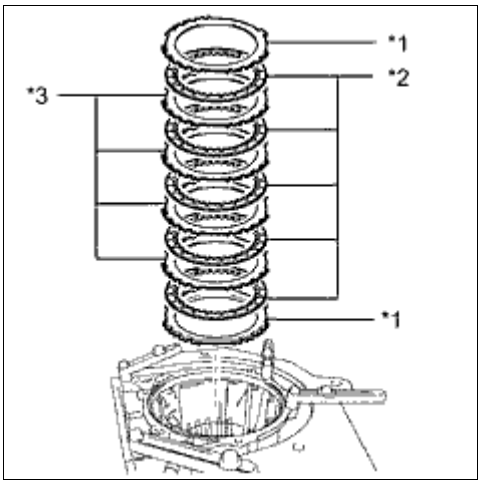
Be sure to install the thrust needle roller bearing in the correct direction.

(b) Install the center planetary ring gear flange with center planetary ring gear to the automatic transmission case sub-assembly.

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23. INSTALL NO. 2 BRAKE DISC

(a) Install the 2 No. 2 brake flanges, 5 No. 2 brake discs and 4 No. 2 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate

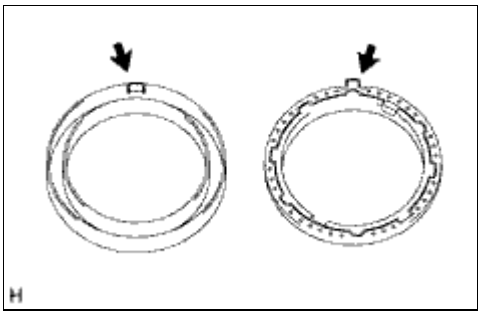
NOTICE:

- Make sure that the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are installed in the correct order.
- Install the thicker No. 2 brake flange first, and then install the thinner one.

24. INSTALL NO. 2 BRAKE PISTON

(a) Coat 2 new O-rings with ATF and install them to the No. 2 brake piston.

(b) With the No. 2 brake piston return spring sub-assembly installed to the No. 2 brake piston, align the claw of the No. 2 brake piston return spring sub-assembly with the claw of the No. 2 brake cylinder, and then install the No. 2 brake piston to the No. 2 brake cylinder.

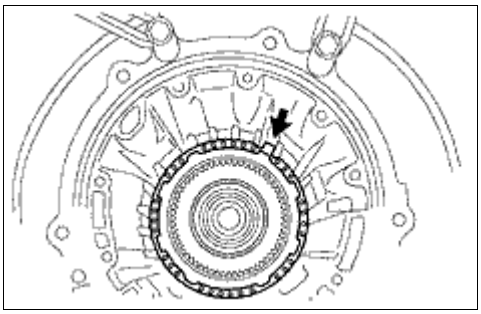


NOTICE:

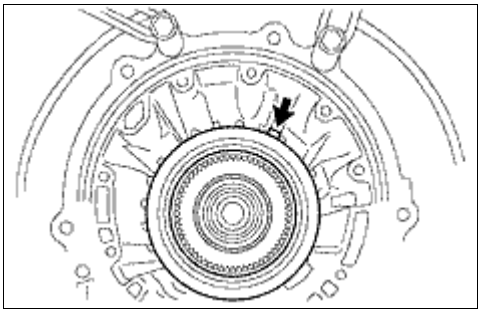
Be careful not to damage the O-rings.

25. INSTALL NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Install the No. 2 brake piston return spring sub-assembly to the automatic transmission case sub-assembly while making sure that the claw of the No. 2 brake piston return spring sub-assembly is positioned as shown in the illustration.

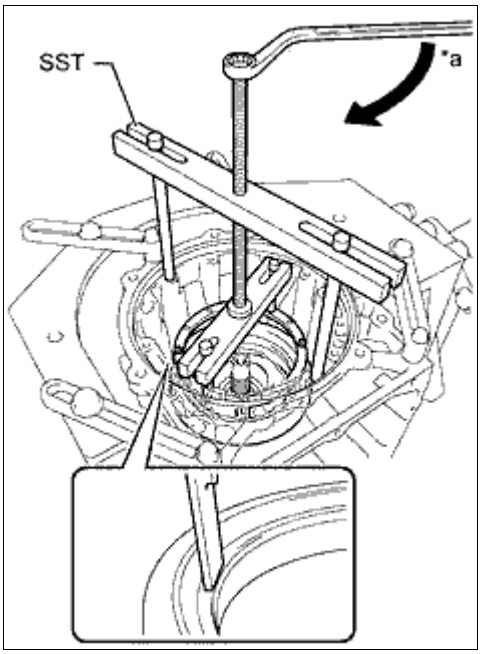


(b) Install the No. 2 brake cylinder with No. 2 brake piston to the automatic transmission case sub-assembly while making sure that the claw of the No. 1 brake cylinder with No. 1 brake piston is positioned as shown in the illustration.



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(c) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



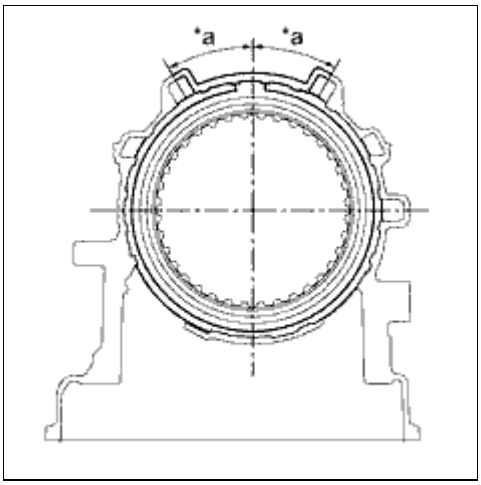
Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06020
09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(d) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	30°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

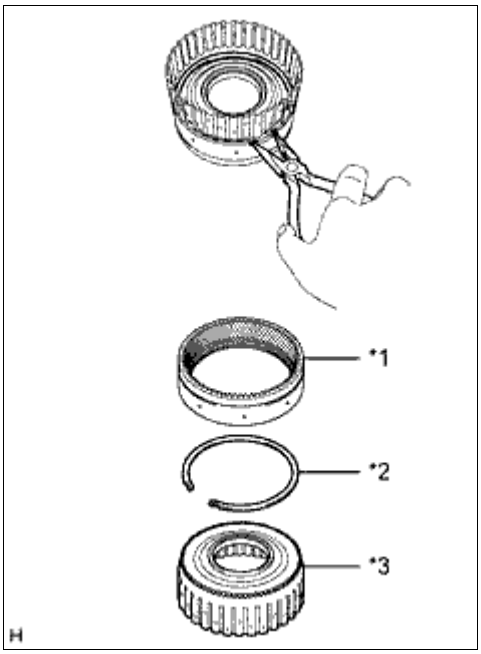
Tape the screwdriver tip before use.

26. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

27. INSTALL FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

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(a) Set the snap ring onto the front planetary ring gear flange sub-assembly. Using needle-nose pliers, insert the snap ring into the front planetary ring gear while squeezing it, and then expand the snap ring to install it.



Text in Illustration

*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly

NOTICE:

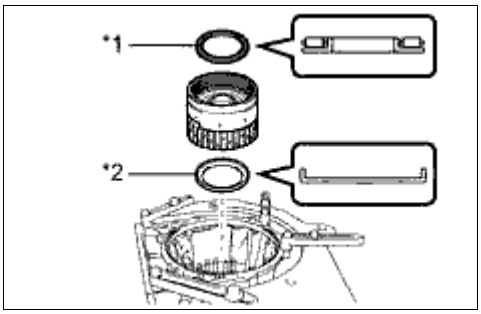
Make sure the snap ring is securely inserted into the groove of the front planetary ring gear.

28. INSTALL FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the front planetary ring gear with front planetary ring gear flange sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing G
*2	Thrust Bearing Race H



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing G	63.3 (2.492)	78.8 (3.102)
Thrust Bearing Race H	66.3 (2.610)	78.9 (3.106)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the front planetary ring gear with front planetary ring gear flange sub-assembly to the automatic transmission case sub-assembly.

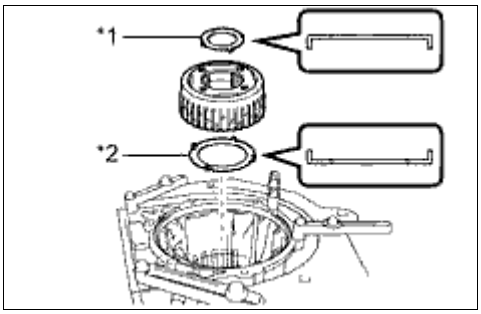
29. INSTALL FRONT PLANETARY GEAR ASSEMBLY

cardiagn.com

(a) Coat the 2 thrust bearing races with ATF and install them to the front planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race F
*2	Thrust Bearing Race G



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race F	44.0 (1.732)	62.8 (2.472)
Thrust Bearing Race G	65.8 (2.591)	86.3 (3.398)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

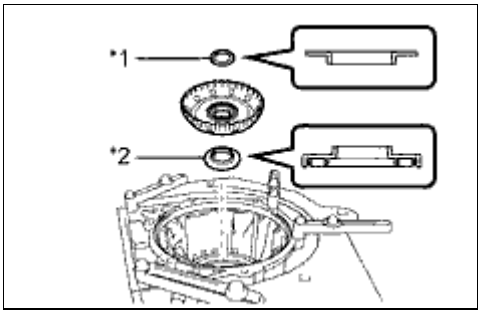
(b) Install the front planetary gear assembly to the automatic transmission case sub-assembly.

30. INSTALL SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the sun gear input drum sub-assembly.

Text in Illustration

*1	Thrust Bearing Race E
*2	Thrust Needle Roller Bearing F



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race E	40.83 (1.607)	52.8 (2.079)
Thrust Needle Roller Bearing F	37.1 (1.461)	61.2 (2.409)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the sun gear input drum sub-assembly to the automatic transmission case sub-assembly.

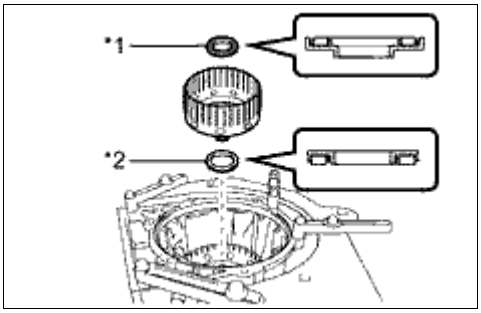
31. INSTALL FORWARD CLUTCH HUB SUB-ASSEMBLY

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(a) Coat the 2 thrust needle roller bearings with ATF and install them to the forward clutch hub sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing D
*2	Thrust Needle Roller Bearing E



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing D	33.3 (1.311)	56.6 (2.228)
Thrust Needle Roller Bearing E	39.6 (1.559)	52.8 (2.079)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

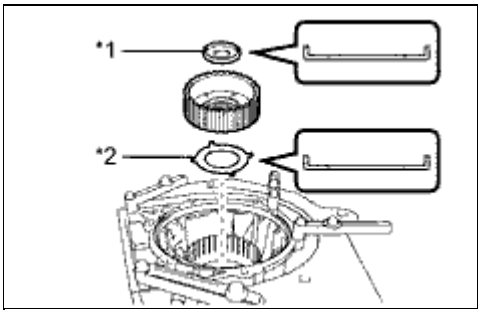
(b) Install the forward clutch hub sub-assembly to the automatic transmission case sub-assembly.

32. INSTALL MULTIPLE DISC CLUTCH HUB

(a) Coat the 2 thrust bearing races with ATF and install them to the multiple disc clutch hub.

Text in Illustration

*1	Thrust Bearing Race C
*2	Thrust Bearing Race D



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race C	22.0 (0.866)	44.8 (1.764)
Thrust Bearing Race D	38.4 (1.512)	56.5 (2.224)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

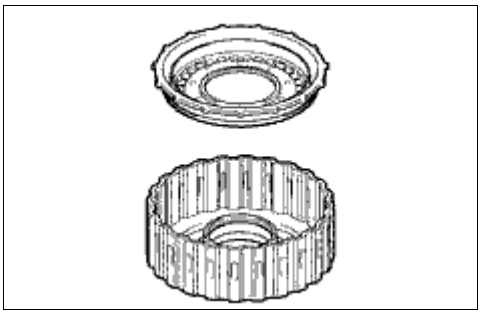
(b) Install the multiple disc clutch hub to the automatic transmission case sub-assembly.

33. INSTALL DIRECT CLUTCH PISTON

(a) Coat 2 new O-rings with ATF, and install them to the direct clutch piston.

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(b) Install the direct clutch piston to the direct clutch drum sub-assembly.

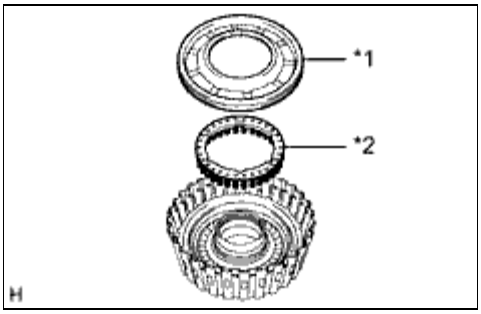


NOTICE:

Be careful not to damage the O-rings.

34. INSTALL NO. 2 CLUTCH BALANCER

(a) Install the direct clutch return spring sub-assembly to the direct clutch piston.



Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly

(b) Coat a new O-ring with ATF, and install it to the No. 2 clutch balancer.

(c) Install the No. 2 clutch balancer to the direct clutch drum sub-assembly.

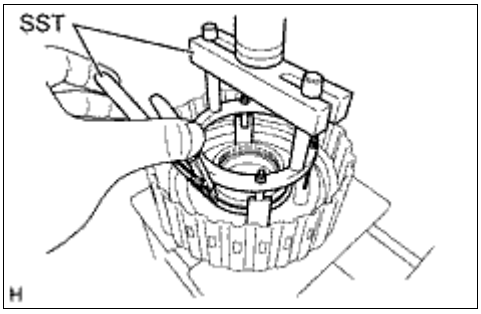
NOTICE:

Be careful not to damage the O-ring.

(d) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(e) Using SST, install the snap ring.

SST: 09350-30020

09350-07070

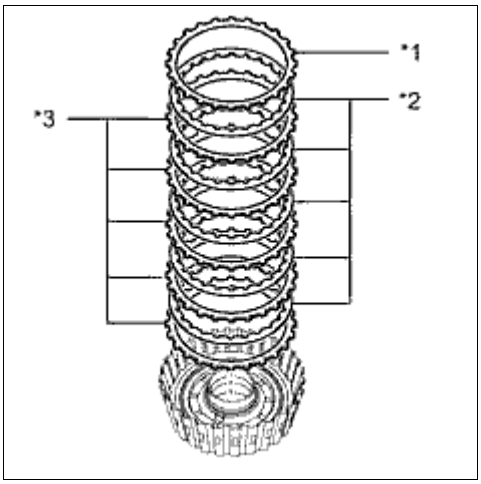
NOTICE:

Do not expand the snap ring excessively.

35. INSTALL NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

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(a) Install the 5 No. 2 clutch plates, 5 No. 2 clutch discs and direct clutch flange to the direct clutch drum sub-assembly.



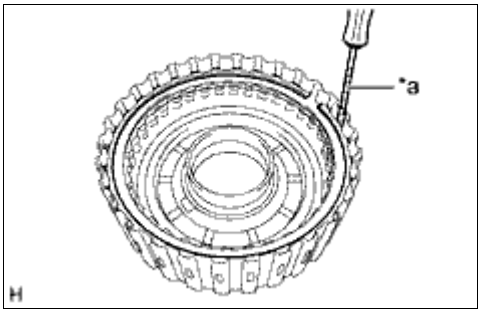
Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

NOTICE:

Make sure that the No. 2 clutch discs, No. 2 clutch plates and direct clutch flange are installed in the correct order.

(b) Using a screwdriver, install the snap ring to the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

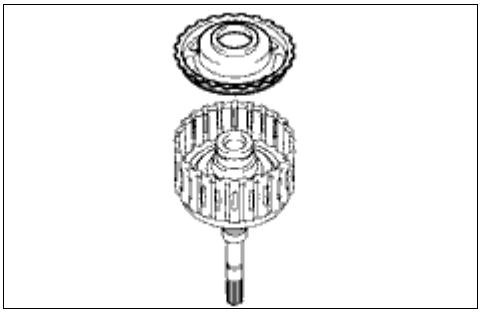
36. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

37. INSTALL FORWARD CLUTCH PISTON

(a) Coat a new O-ring with ATF, and install it to the input shaft sub-assembly.

(b) Coat a new O-ring with ATF, and install it to the forward clutch piston.

(c) Install the forward clutch piston to the input shaft sub-assembly.



NOTICE:

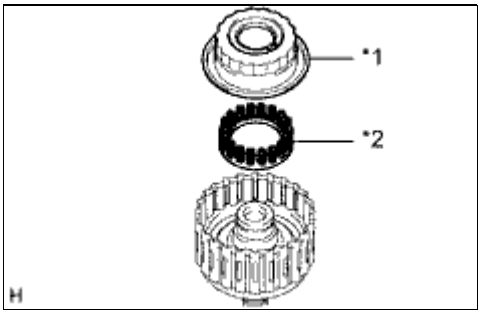
Be careful not to damage the O-rings.

38. INSTALL NO. 1 CLUTCH BALANCER

(a) Coat a new O-ring with ATF, and install it to the No. 1 clutch balancer.

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(b) Install the forward clutch return spring sub-assembly and No. 1 clutch balancer to the input shaft sub-assembly.



Text in Illustration

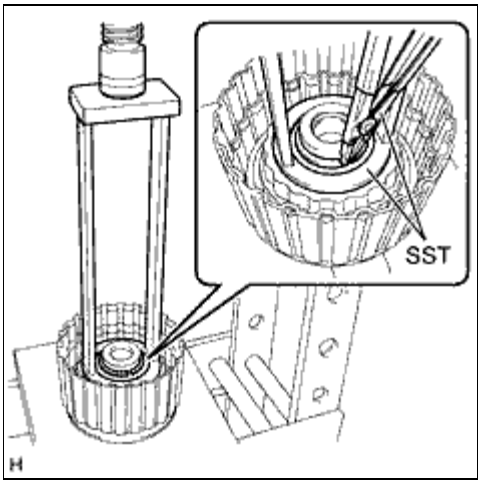
*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

NOTICE:

Be careful not to damage the O-ring.

(c) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(d) Using SST, install the snap ring.

SST: 09350-30020

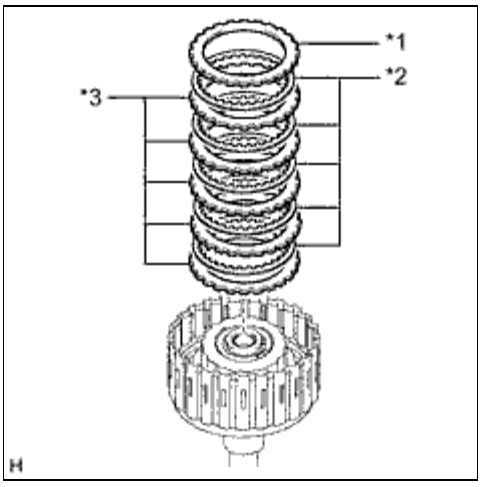
09350-07070

NOTICE:

Do not expand the snap ring excessively.

39. INSTALL NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Install the 5 No. 1 clutch plates, 5 No. 1 clutch discs and forward clutch flange to the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

NOTICE:

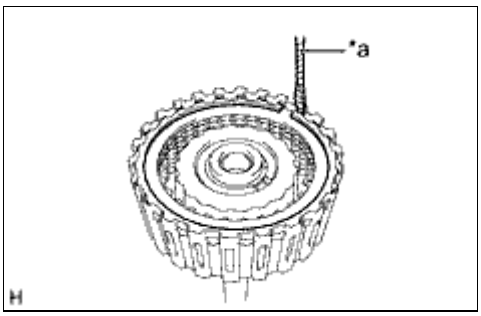
Make sure that the No. 1 clutch discs, No. 1 clutch plates and forward clutch flange are installed in the correct order.

cardiagn.com

(b) Using a screwdriver, install the snap ring.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the input shaft sub-assembly.

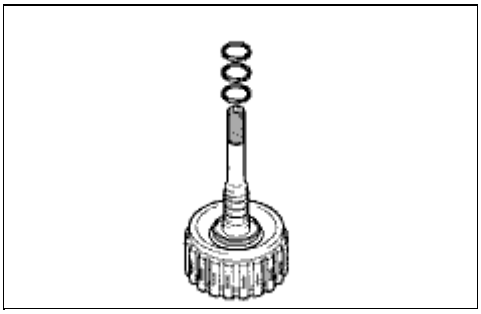
HINT:

Tape the screwdriver tip before use.

40. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH DISC) INFO

41. INSTALL CLUTCH DRUM OIL SEAL RING

(a) Coat 3 new clutch drum oil seal rings with ATF and install them to the input shaft sub-assembly.



NOTICE:

Do not expand the clutch drum oil seal ring ends excessively.

HINT:

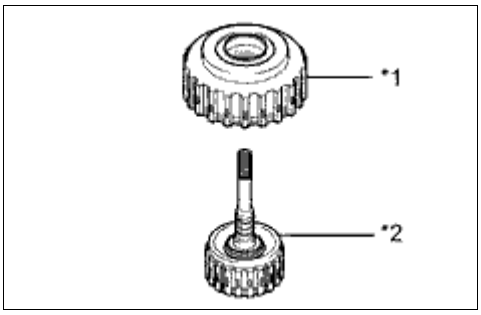
After installing the clutch drum oil seal rings, check that they rotate smoothly.

42. INSTALL DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Install the direct clutch drum sub-assembly to the input shaft sub-assembly.

Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly



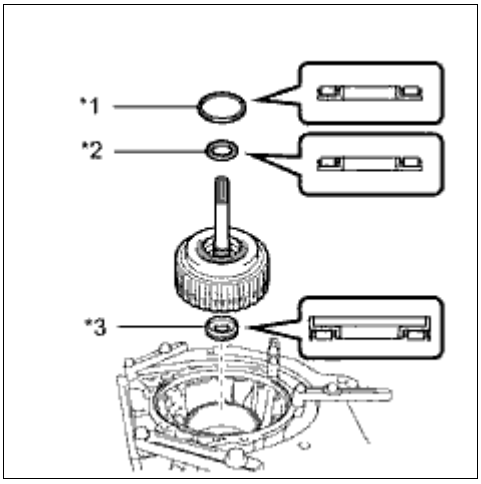
43. INSTALL CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

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(a) Coat the 3 thrust needle roller bearings with ATF and install them to the clutch drum and input shaft assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing A
*2	Thrust Needle Roller Bearing B
*3	Thrust Needle Roller Bearing C



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing A	71.9 (2.831)	85.6 (3.370)
Thrust Needle Roller Bearing B	34.6 (1.362)	52.0 (2.047)
Thrust Needle Roller Bearing C	21.3 (0.839)	41.1 (1.618)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

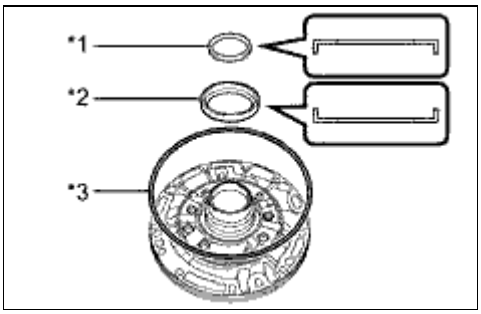
(b) Install the clutch drum and input shaft assembly to the automatic transmission case sub-assembly.

44. INSTALL OIL PUMP ASSEMBLY

(a) Coat the 2 thrust bearing races with ATF and install them to the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race B
*2	Thrust Bearing Race A
*3	Oil Pump O-ring



Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race B	40.0 (1.575)	52.8 (2.079)
Thrust Bearing Race A	74.2 (2.921)	87.74 (3.454)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

(b) Coat a new oil pump O-ring with ATF, and install it to the oil pump assembly.

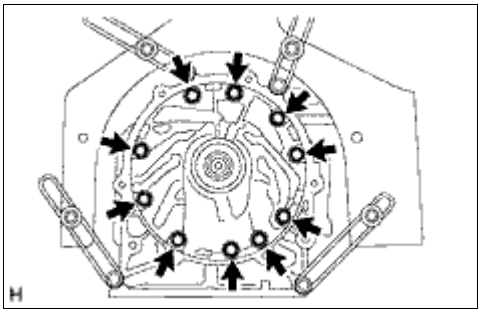
cardiagn.com

(c) Set the oil pump assembly on the input shaft, and align the bolt holes of the oil pump assembly with the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the oil pump O-ring.

(d) Temporarily install the oil pump assembly to the automatic transmission case sub-assembly.

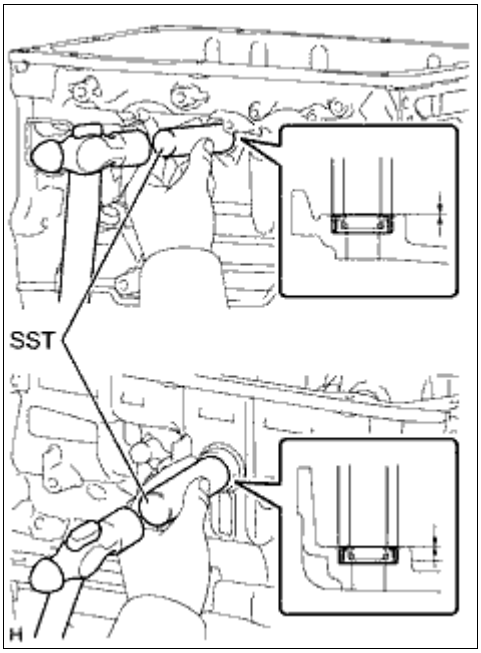


(e) Install the oil pump assembly with the 10 bolts.

Torque:

21 N·m {215 kgf·cm, 16ft·lbf}

45. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL



(a) Using SST and a hammer, drive in 2 new manual valve lever shaft oil seals to the automatic transmission case sub-assembly.

SST: 09350-30020

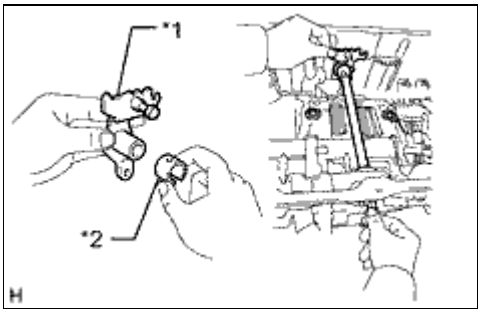
09350-07110

Standard depth:

-0.5 to 0.5 mm (-0.0196 to 0.0196 in.)

(b) Coat the lip of the manual valve lever shaft oil seal with MP grease.

46. INSTALL MANUAL VALVE LEVER SUB-ASSEMBLY



(a) Install a new spacer to the manual valve lever sub-assembly.

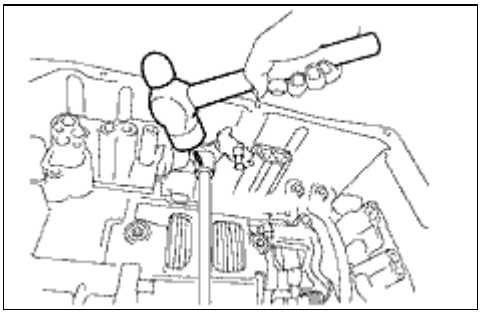
Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Spacer

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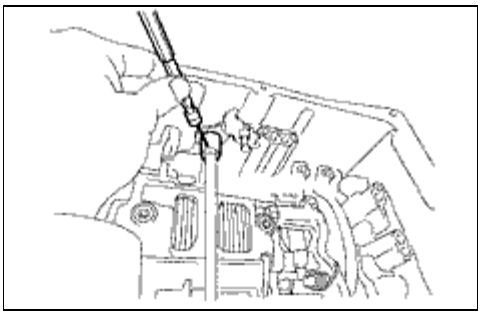
(b) Install the manual valve lever shaft to the automatic transmission case sub-assembly through the manual valve lever sub-assembly.

(c) Using a hammer, drive in a new spring pin.



(d) Turn the spacer and manual valve lever shaft to align the smaller hole on the spacer with the indent on the manual valve lever sub-assembly.

(e) Using a 3 mm pin punch and a hammer, stake the spacer.



(f) Check that the spacer does not turn.

(g) Make sure that the shaft rotates smoothly.

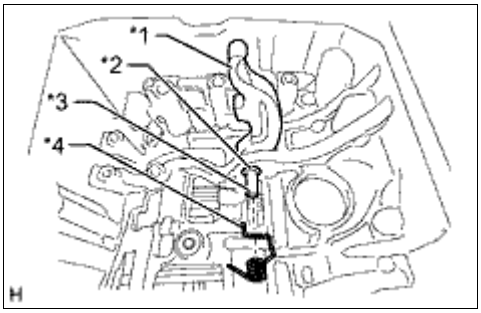
47. INSTALL PARKING LOCK PAWL SHAFT

(a) Install the E-ring to the parking lock pawl shaft.

(b) Install the parking lock pawl, parking lock pawl shaft and spring to the automatic transmission case sub-assembly.

Text in Illustration

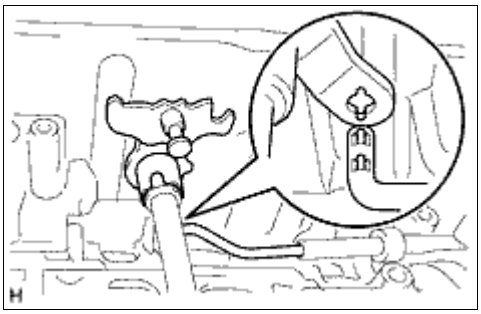
*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring



48. INSTALL PARKING LOCK ROD SUB-ASSEMBLY

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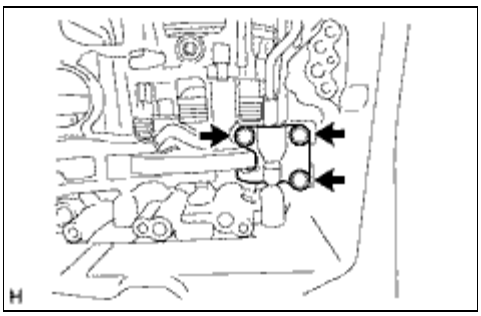
(a) Install the parking lock rod sub-assembly to the manual valve lever sub-assembly.



49. INSTALL PARKING LOCK PAWL BRACKET

(a) Install the parking lock pawl bracket to the automatic transmission case sub-assembly with the 3 bolts.

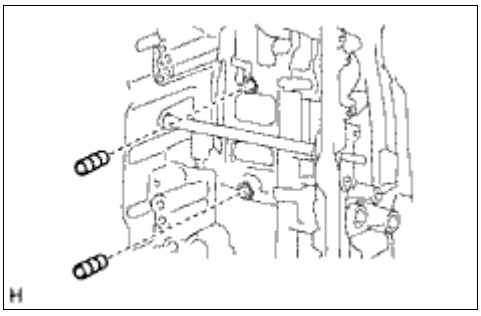
Torque:
18 N·m {184 kgf·cm, 13ft·lbf}



(b) Move the manual valve lever sub-assembly to P, and check the output shaft is locked by the parking lock pawl.

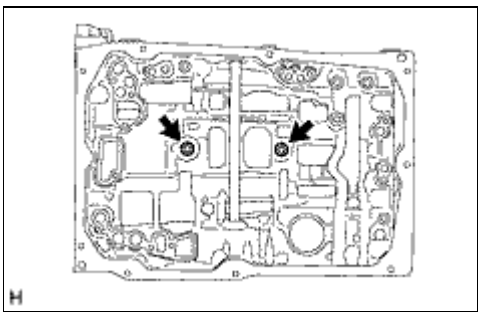
50. INSTALL BRAKE DRUM GASKET

(a) Coat 2 new brake drum gaskets with ATF and install them to the automatic transmission case sub-assembly.



51. INSTALL TRANSMISSION CASE GASKET

(a) Coat 2 new transmission case gaskets with ATF and install them to the automatic transmission case sub-assembly.



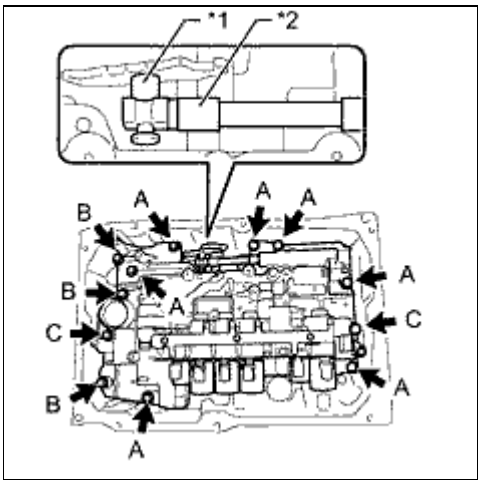
52. INSTALL TRANSMISSION VALVE BODY ASSEMBLY

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(a) Insert the manual valve lever sub-assembly into the groove on the end of the manual valve and install the transmission valve body assembly to the automatic transmission case sub-assembly with the 12 bolts.

Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Manual Valve



Torque:

11 N·m {112 kgf·cm, 8ft·lbf}

HINT:

Each bolt length is indicated below.

Bolt length:

Bolt A

25 mm (0.984 in.)

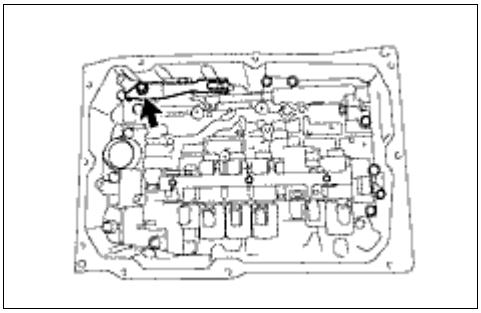
Bolt B

36 mm (1.42 in.)

Bolt C

50 mm (1.97 in.)

(b) Install the detent spring and detent spring cover to the transmission valve body assembly with the bolt.



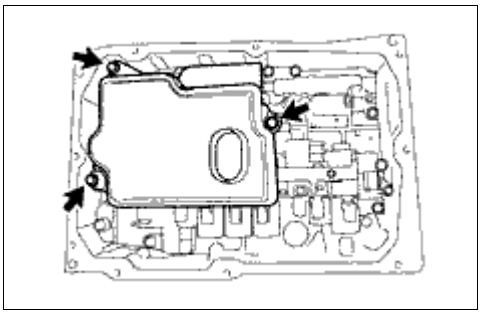
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

53. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the valve body oil strainer assembly.

(b) Install the valve body oil strainer assembly to the transmission valve body assembly with the 3 bolts.



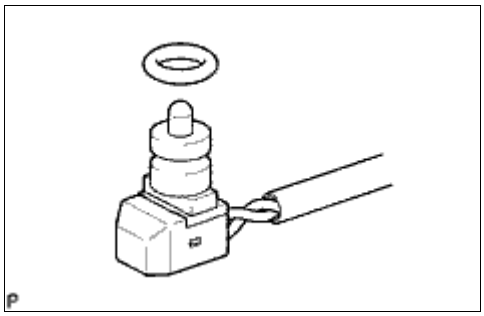
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

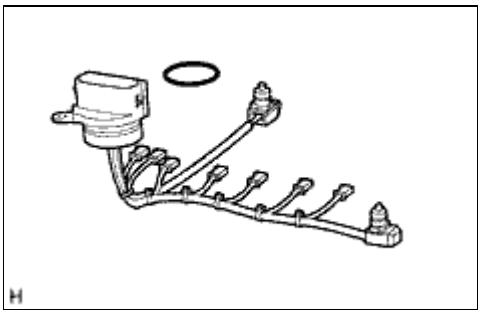
54. INSTALL TRANSMISSION WIRE

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(a) Coat 2 new O-rings with ATF, and install them to the 2 temperature sensors.



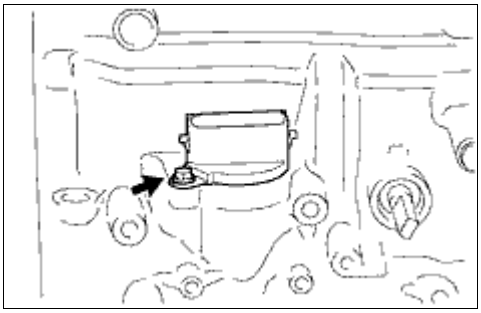
(b) Coat a new O-ring with ATF, and install it to the transmission wire.



(c) Install the transmission wire to the automatic transmission case sub-assembly with the bolt.

Torque:

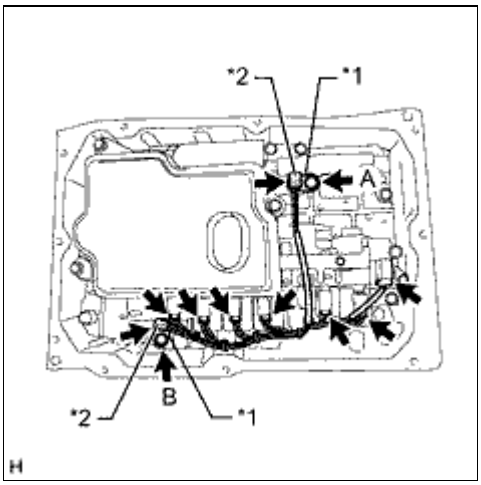
5.4 N·m {55 kgf·cm, 48in·lbf}



(d) Connect the 7 solenoid valve connectors.

Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor



(e) Install the 2 temperature sensors and 2 temperature sensor clamps to the transmission valve body assembly with the bolt.

Torque:

for Bolt A -

10 N·m {102 kgf·cm, 7ft·lbf}

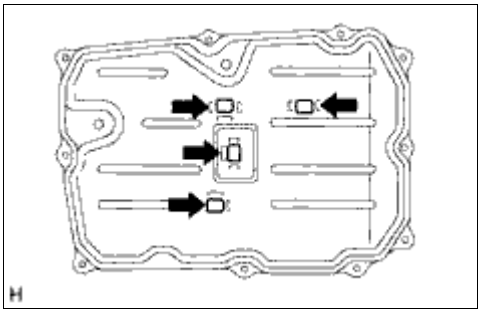
for Bolt B -

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11 N·m {112 kgf·cm, 8ft·lbf}

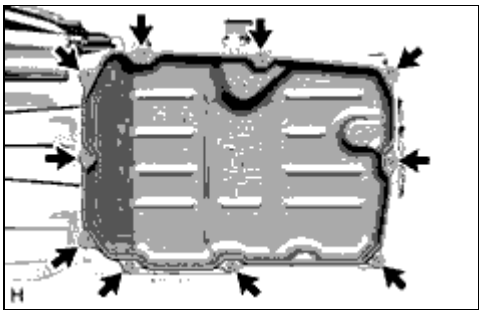
55. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Install the 4 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly as shown in the illustration.



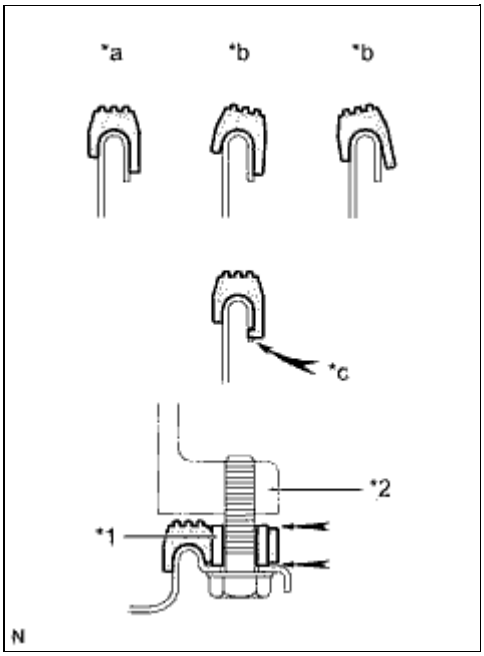
(b) Install a new automatic transmission oil pan gasket to the automatic transmission oil pan sub-assembly.

(c) Install the automatic transmission oil pan sub-assembly with automatic transmission oil pan gasket to the automatic transmission case sub-assembly with the 10 bolts.



Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}



Text in Illustration

*1	Sleeve
*2	Automatic Transmission Case Sub-assembly

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*a	Correct
*b	Incorrect
*c	Protrusion

NOTICE:

- Make sure that automatic transmission oil pan gasket seal surface and automatic transmission oil pan sub-assembly contact surface are free of oil and foreign matter.
- Install the automatic transmission oil pan gasket so that there is no slack in the automatic transmission oil pan gasket, and the entire seal surface is level.
- Make sure that the 8 protrusions are properly engaged to the automatic transmission oil pan sub-assembly.
- When installing the automatic transmission oil pan sub-assembly, make sure that the automatic transmission oil pan gasket is not pinched between the sleeve and the seal surface of the automatic transmission case sub-assembly.

(d) Install the drain plug and a new gasket to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

(e) Using a 5 mm hexagon socket wrench, install a new gasket and overflow plug to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

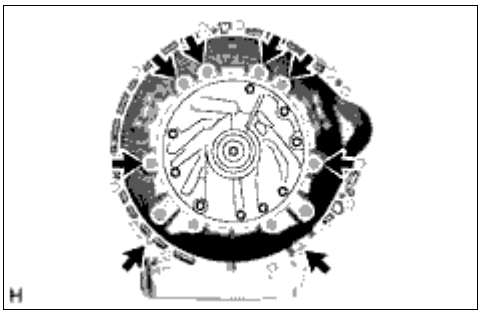
56. INSTALL AUTOMATIC TRANSMISSION HOUSING

(a) Clean and degrease the bolts and bolt holes with non-residue solvent.

(b) Install the automatic transmission housing to the automatic transmission case sub-assembly with the 8 bolts.

Torque:

34 N·m {346 kgf·cm, 25ft·lbf}



(c) Apply adhesive to 2 or 3 threads on the end of the 4 bolts.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(d) Install 4 bolts to the automatic transmission housing.

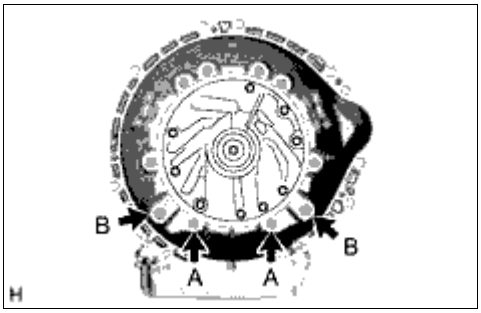
Torque:

for Bolt A (M10 bolt) -

34 N·m {346 kgf·cm, 25ft·lbf}

for Bolt B (M12 bolt) -

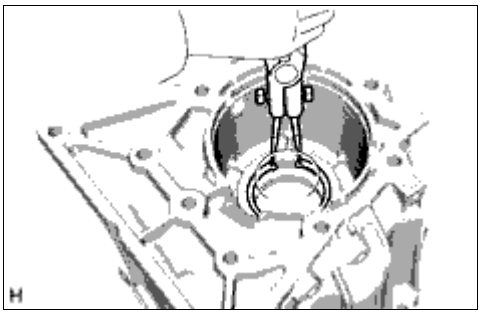
57 N·m {579 kgf·cm, 42ft·lbf}



57. INSTALL REAR TRANSFER CASE ADAPTER OIL RECEIVER

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(a) Install the rear transfer case adapter oil receiver to the rear transfer adapter.



(b) Using snap ring pliers, install the snap ring to the rear transfer adapter.

58. INSTALL TRANSFER ADAPTER OIL SEAL

(a) Using SST and a hammer, drive in a new transfer adapter oil seal to the rear transfer adapter.

SST: 09950-60010

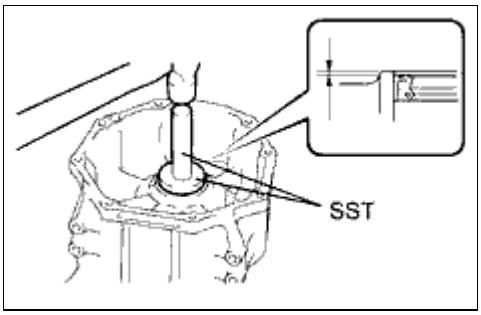
09951-00650

SST: 09950-70010

09951-07150

Standard depth:

0 to 0.5 mm (0 to 0.0196 in.)



(b) Coat the lip of the transfer adapter oil seal with MP grease.

59. INSTALL REAR TRANSFER ADAPTER

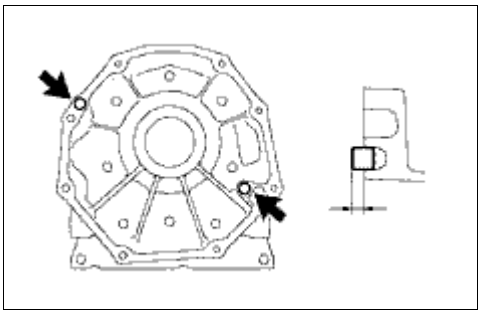
(a) Using a plastic-faced hammer, tap 2 new straight pins into the rear transfer adapter.

Standard protrusion height:

5.7 to 6.3 mm (0.225 to 0.248 in.)

HINT:

It is not necessary to remove the straight pins they are being replaced.

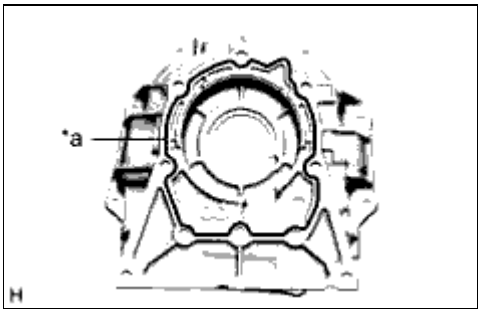


(b) Clean and degrease the threads of the 10 bolts, bolt holes and the contact surfaces of the automatic transmission case sub-assembly and rear transfer adapter with non-residue solvent.

(c) Apply seal packing to the rear transfer adapter as shown in the illustration.

Text in Illustration

*a	Seal Packing



Seal packing:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

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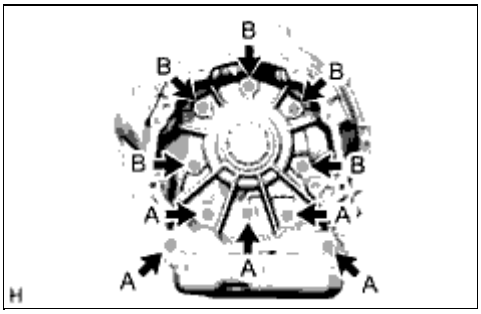
- Apply seal packing in a continuous line (width 1.2 mm (0.0472 in.)) along the sealing surface.
- After applying seal packing, install the rear transfer adapter to the automatic transmission case sub-assembly within 3 minutes and tighten the bolts within 10 minutes.

(d) Apply adhesive to 2 or 3 threads on the end of the 10 bolts.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(e) Install the rear transfer adapter to the automatic transmission case sub-assembly with the 10 bolts.

Torque:
34 N·m {346 kgf·cm, 25ft·lbf}



HINT:

Each bolt length is indicated below.

Bolt length:

for Bolt A

40 mm (1.57 in.)

for Bolt B

50 mm (1.97 in.)

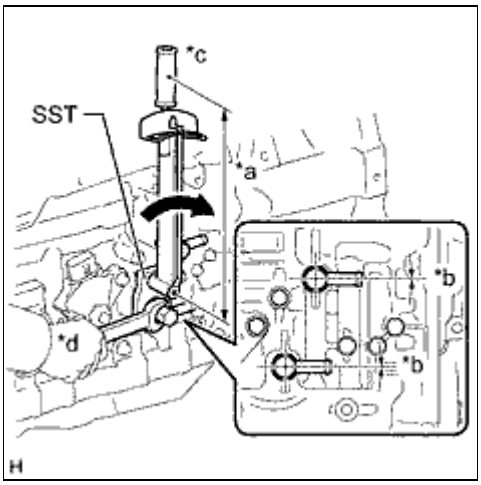
60. INSTALL OIL COOLER TUBE UNION

(a) Coat 2 new O-rings with ATF and install them to the 2 oil cooler tube unions.

(b) Using SST, install the 2 oil cooler tube unions to the automatic transmission case sub-assembly.

Text in Illustration

*a	Torque Wrench Fulcrum Length
*b	-2° to 2°
*c	Turn
*d	Hold



SST: 09268-78010

Torque:
31 N·m {317 kgf·cm, 23ft·lbf}

HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using SST (fulcrum length of 34.5 mm (1.36 in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 26 N*m (266 kgf*cm, 19 ft.*lbf)

61. INSTALL AUTOMATIC TRANSMISSION CASE PLUG

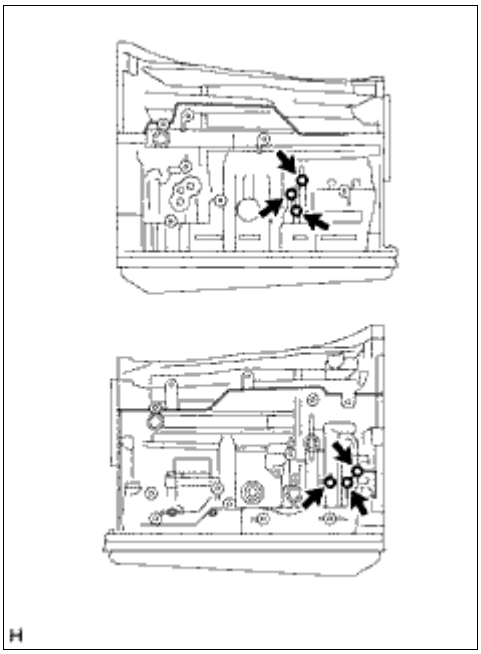
(a) Coat 6 new O-rings with ATF, and install them to the 6 automatic transmission case plugs.

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(b) Install the 6 automatic transmission case plugs to the automatic transmission case sub-assembly.

Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}

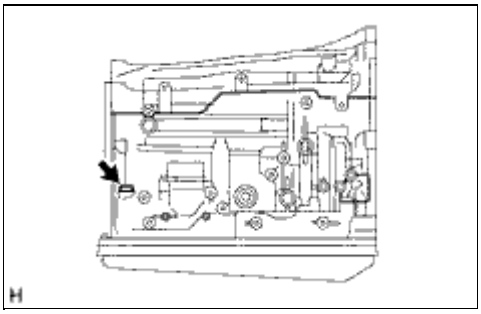


(c) Coat a new O-ring with ATF, and install it to the automatic transmission case plug.

(d) Using a T55 "TORX" socket wrench, install the automatic transmission case plug to the automatic transmission case sub-assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



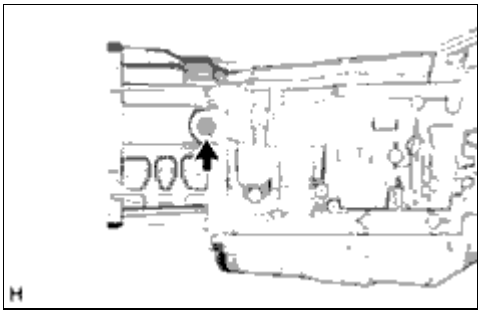
62. INSTALL REFILL PLUG

(a) Coat a new O-ring with ATF, and install it to the refill plug.

(b) Install the refill plug to the rear transfer adapter.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}



63. INSTALL PARK/NEUTRAL POSITION SWITCH

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

(a) Clean the bolt and bolt hole.

(b) Apply adhesive to 2 or 3 threads on the end of the bolt.

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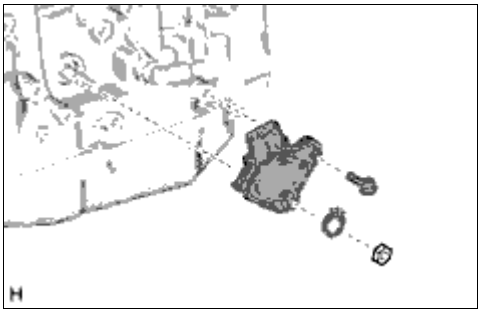
Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

Install the bolt within 3 minutes of applying adhesive.

(c) Temporarily install the park/neutral position switch to the automatic transmission case sub-assembly with the bolt.



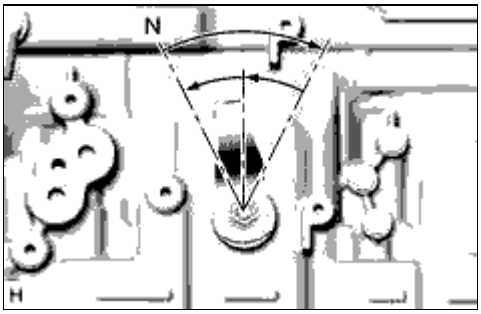
(d) Install a lock washer and nut to the park/neutral position switch.

Torque:

6.9 N·m {70 kgf·cm, 61in·lbf}

(e) Temporarily install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

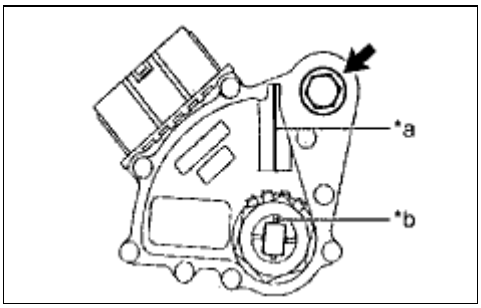
(f) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(g) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.

Text in Illustration

*a	Neutral Basic Line
*b	Groove



Torque:

13 N·m {131 kgf·cm, 9ft·lbf}

(h) Using a screwdriver, bend the tabs of the lock washer.

NOTICE:

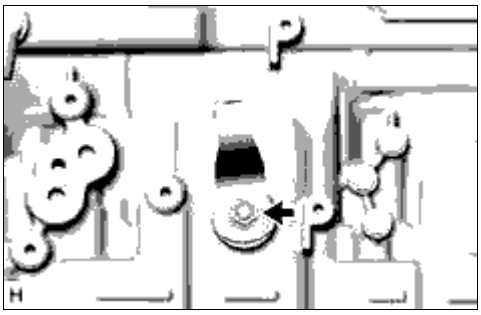
- Be careful not to damage the park/neutral position switch.
- Bend at least 2 of the lock washer tabs.

HINT:

Tape the screwdriver tip before use.

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64. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH

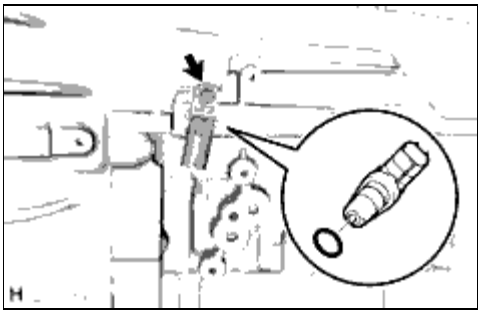


(a) Install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

Torque:

16 N·m {160 kgf·cm, 12ft·lbf}

65. INSTALL TRANSMISSION REVOLUTION SENSOR

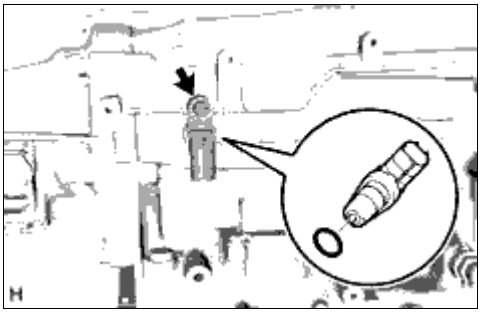


(a) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (NT).

(b) Install the transmission revolution sensor (NT) to the automatic transmission case sub-assembly with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}



(c) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (SP2).

(d) Install the transmission revolution sensor (SP2) to the automatic transmission case sub-assembly with the bolt.

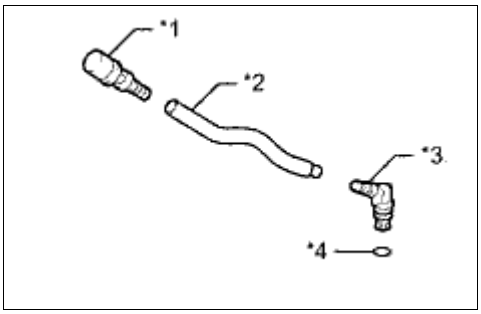
Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

66. INSTALL BREATHER PLUG HOSE

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(a) Install the breather plug sub-assembly and breather plug to the breather plug hose.



Text in Illustration

*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring

(b) Coat a new O-ring with ATF, and install it to the breather plug.

(c) Install the breather plug hose to the automatic transmission case sub-assembly.



NOTICE:

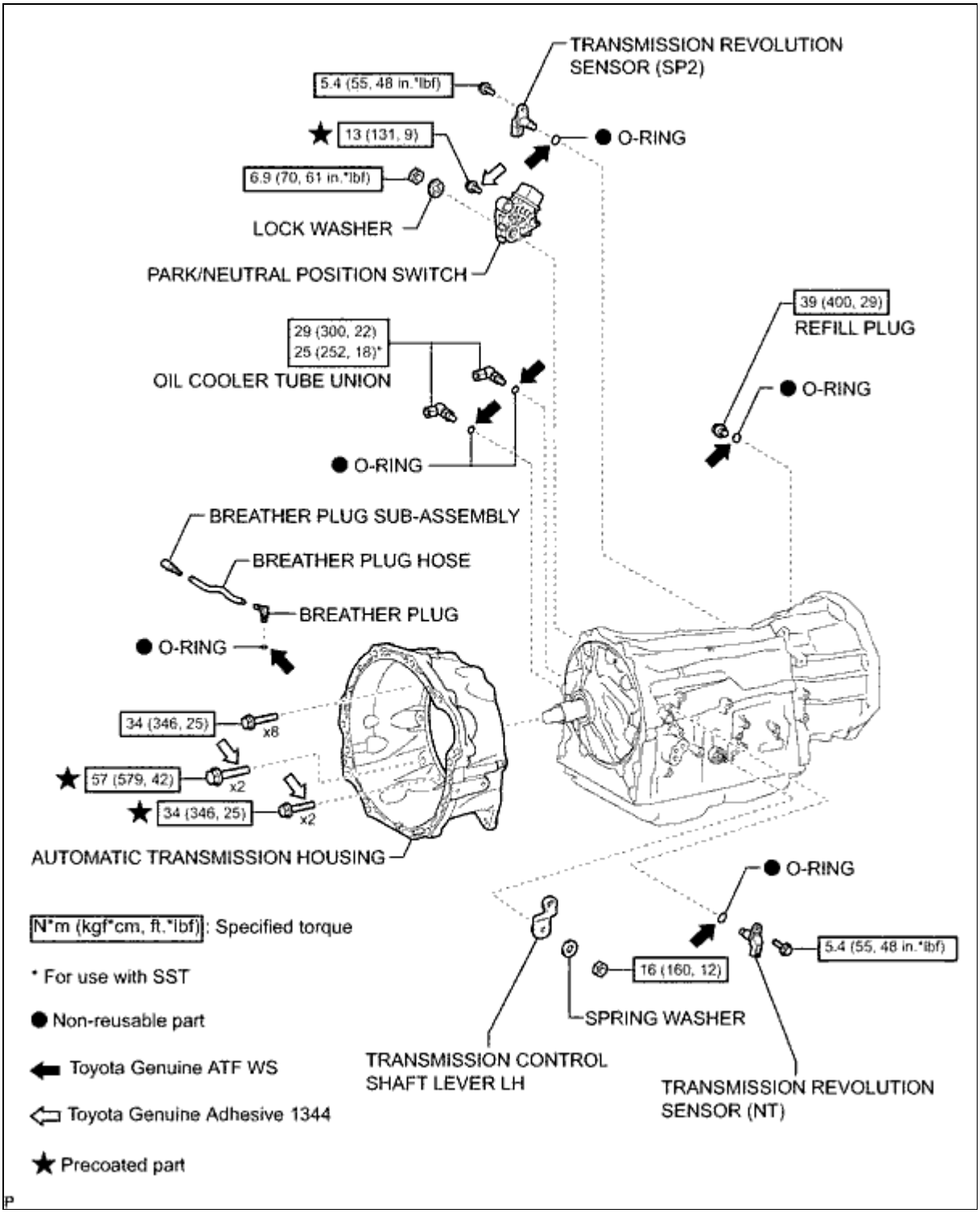
Be careful not to damage the O-rings.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000O9X046X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

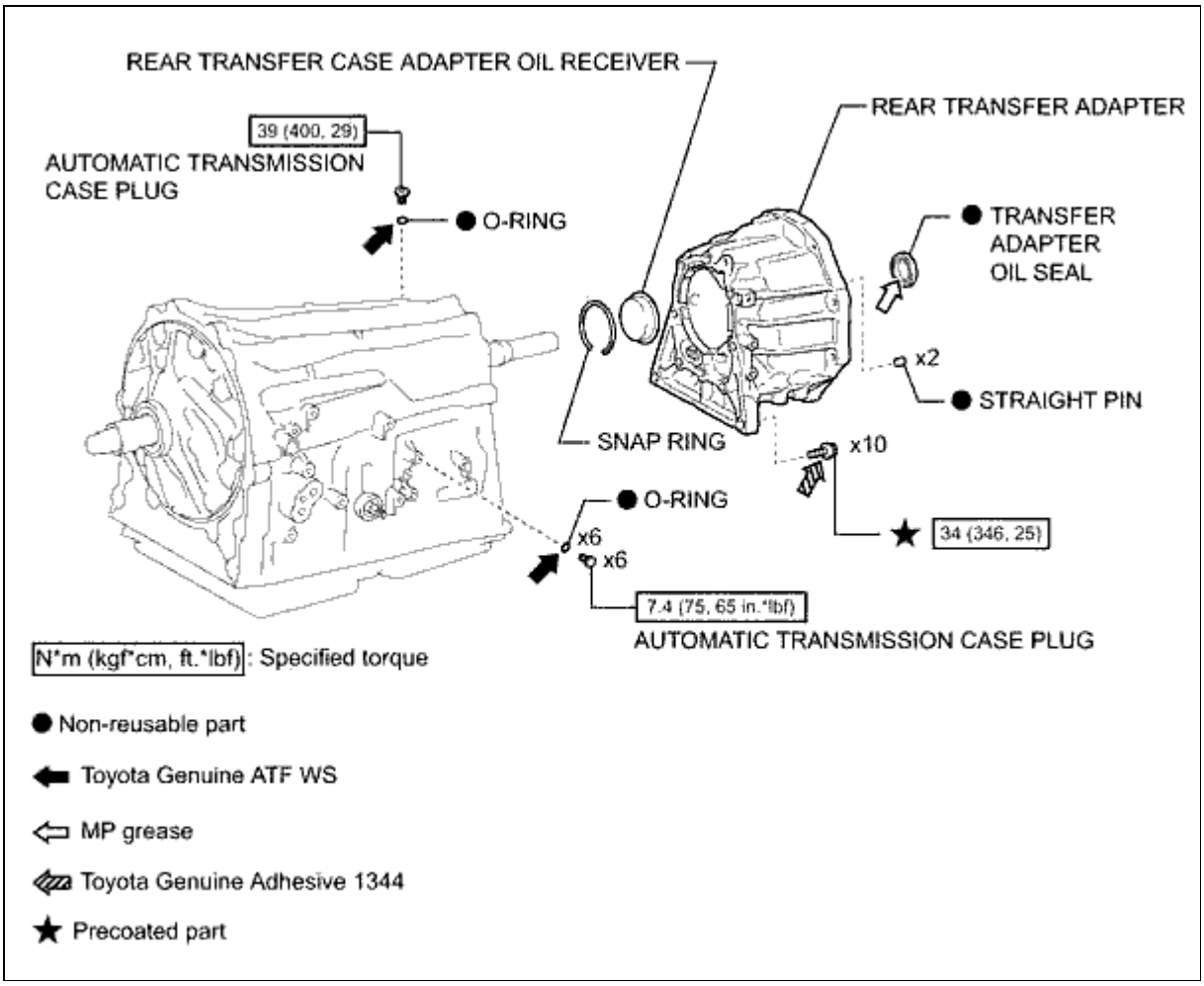
COMPONENTS

ILLUSTRATION



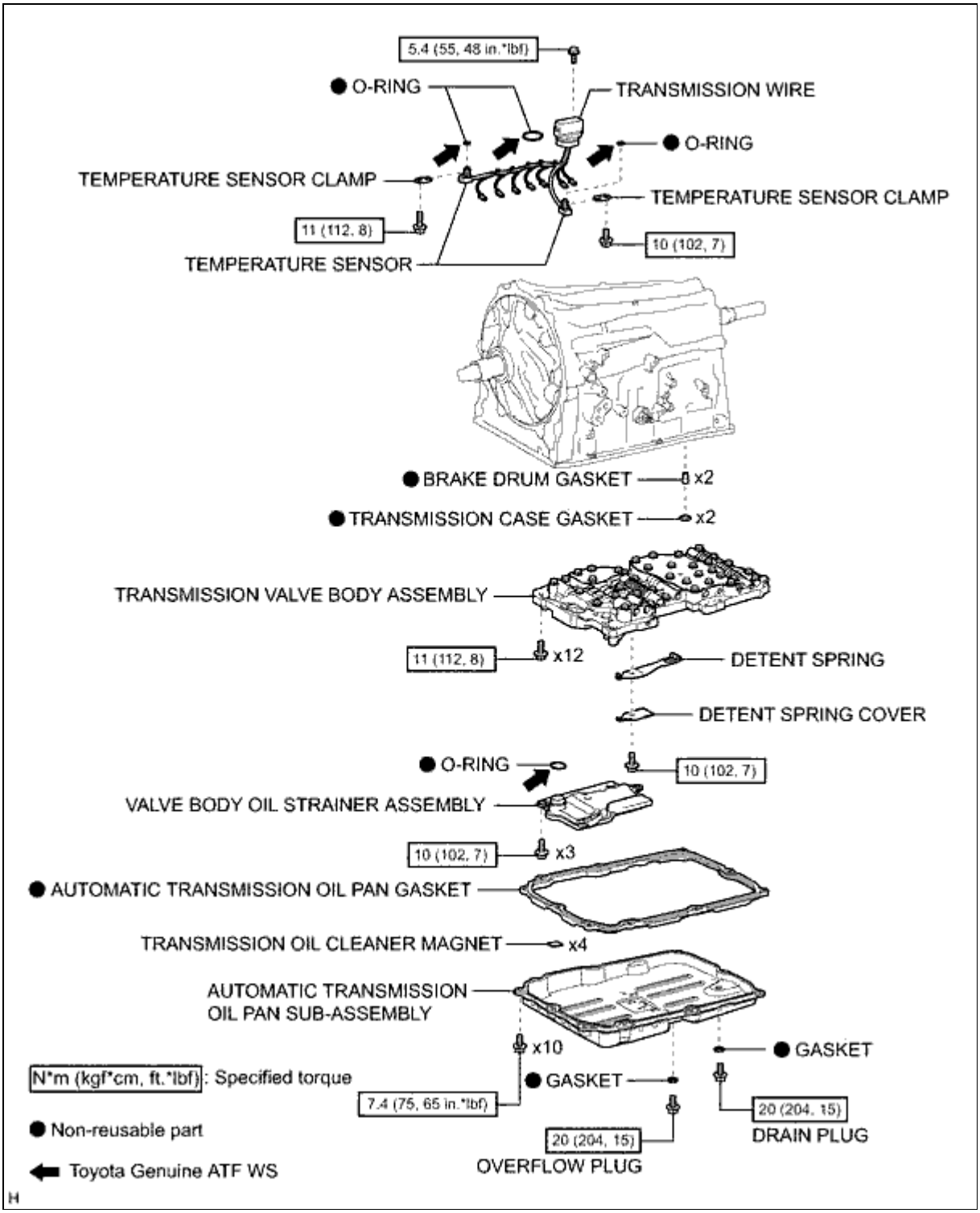
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ILLUSTRATION



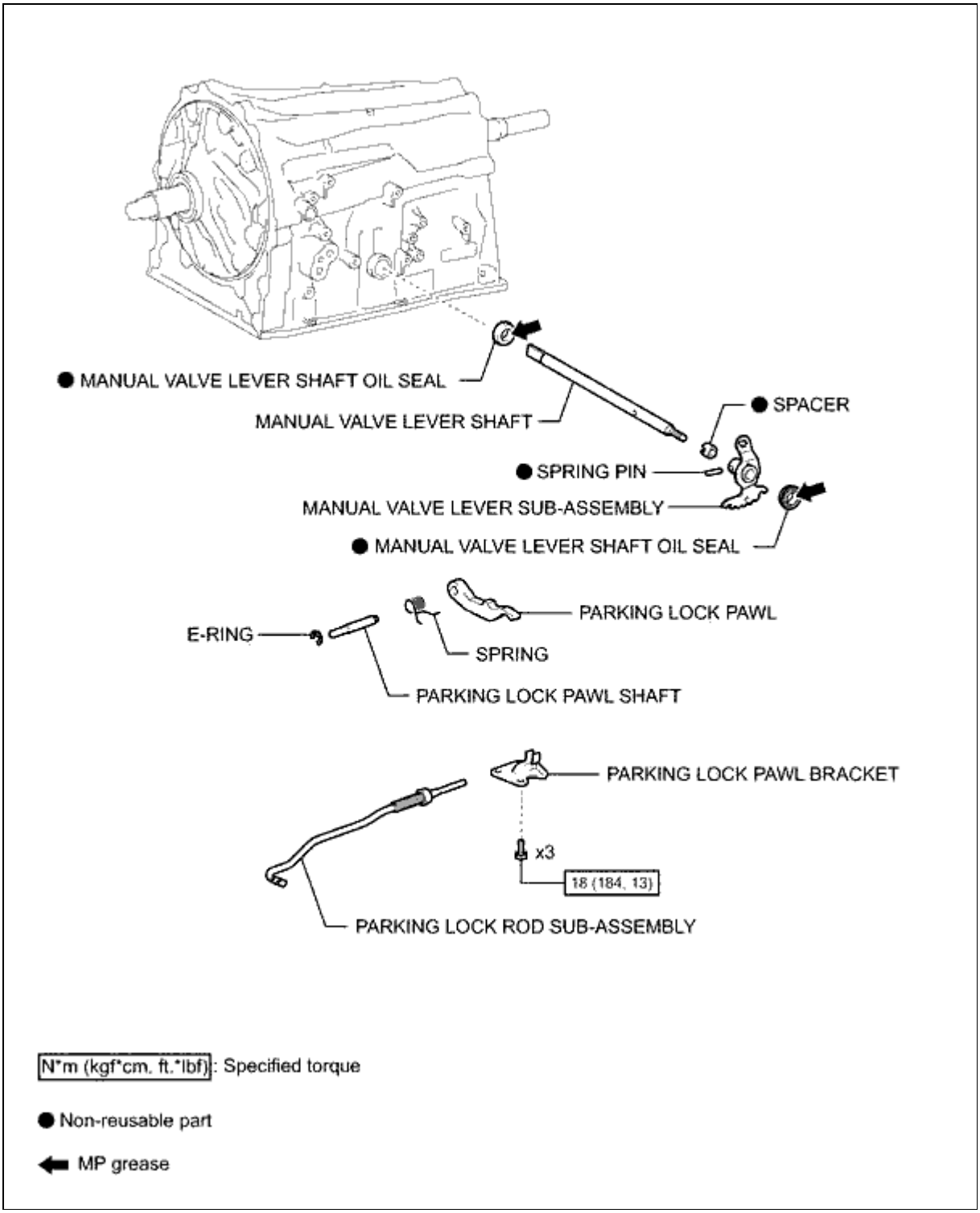
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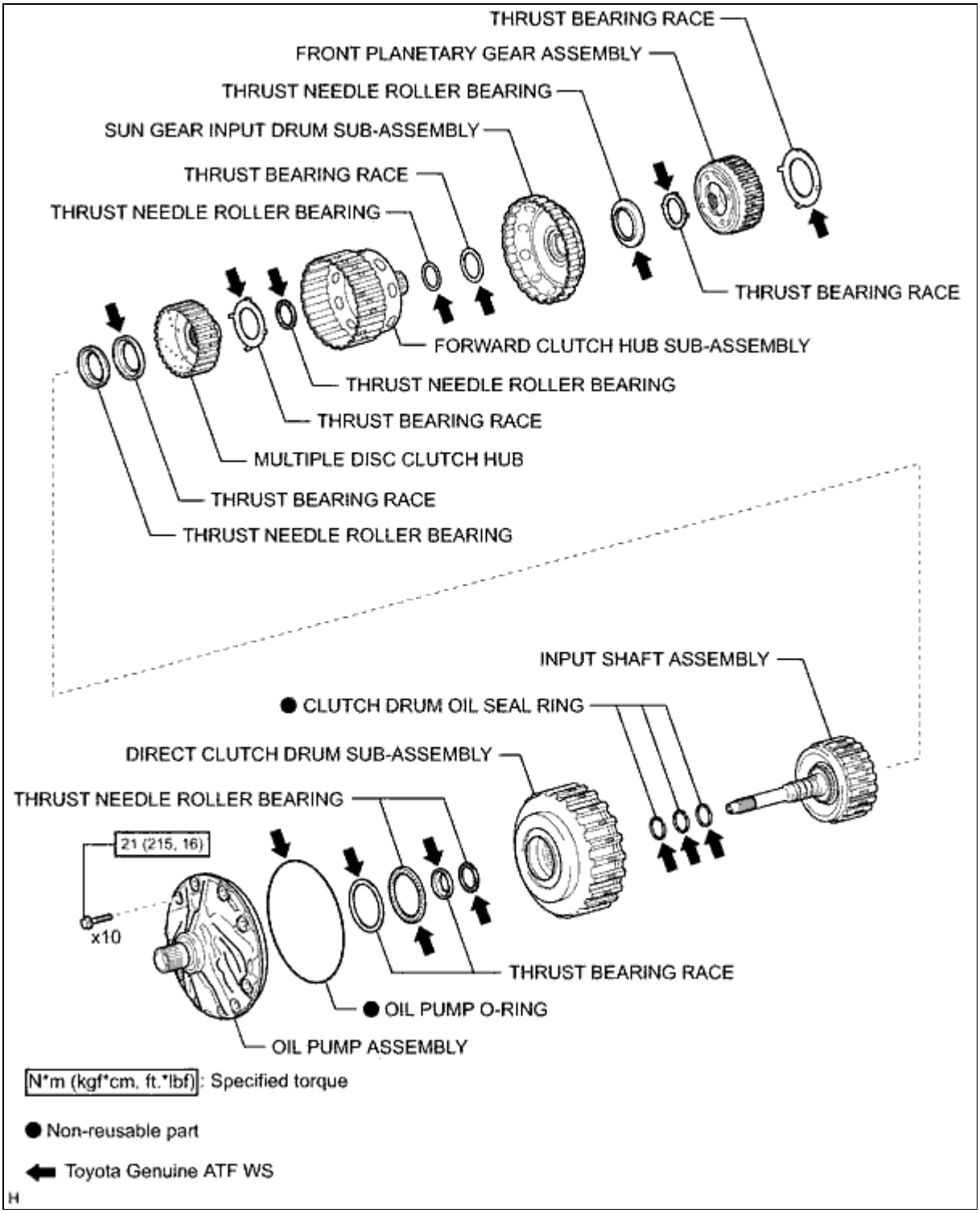
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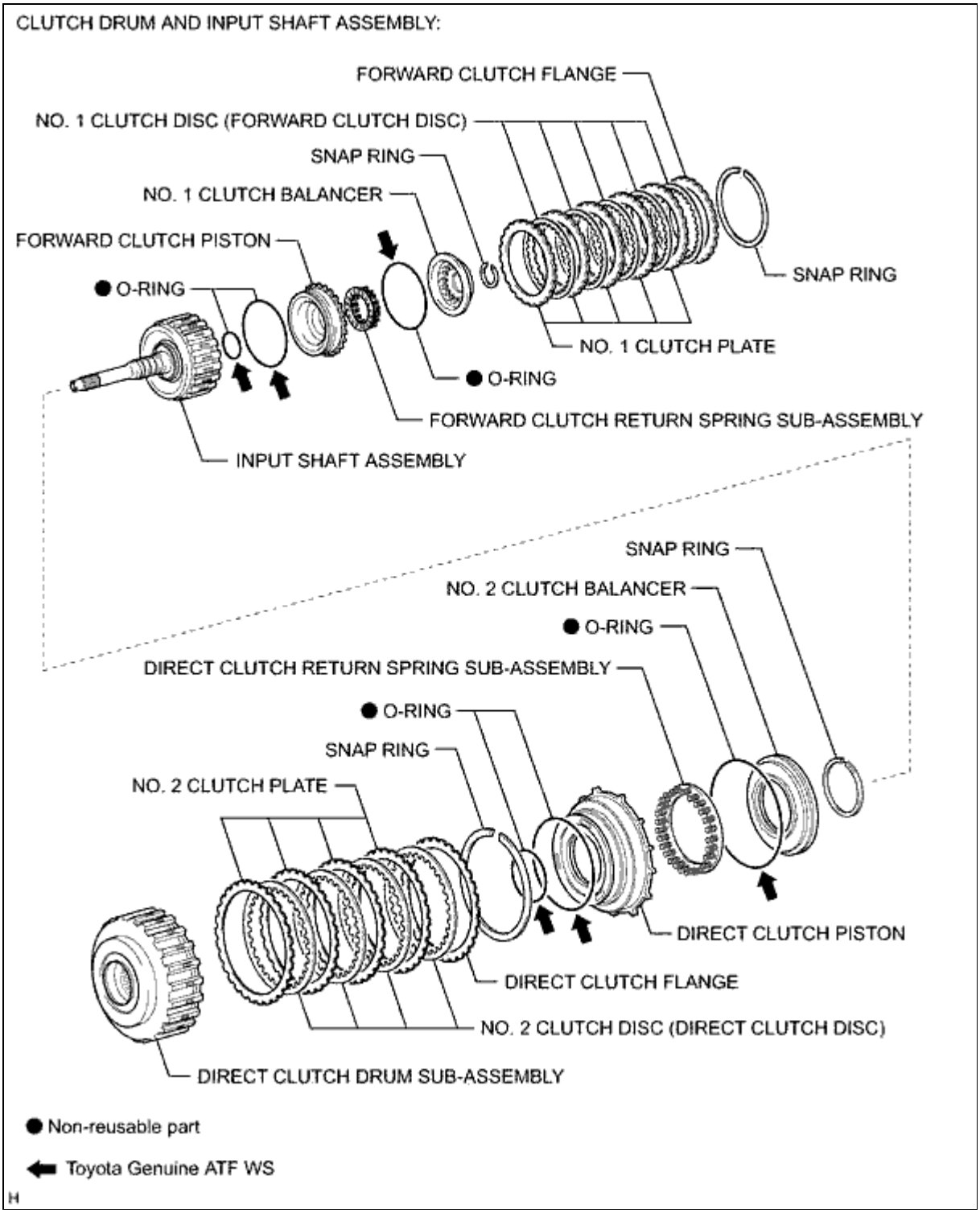
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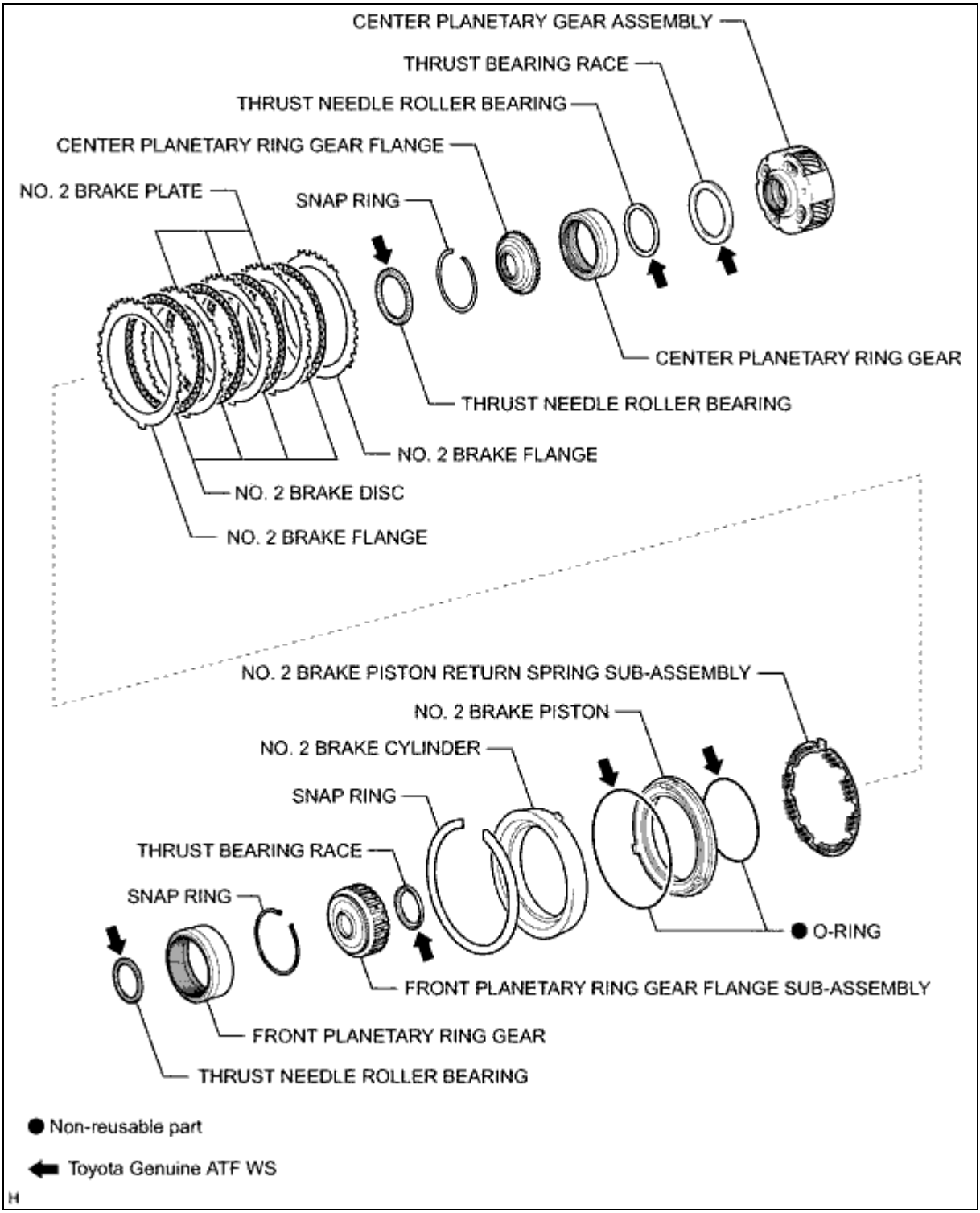
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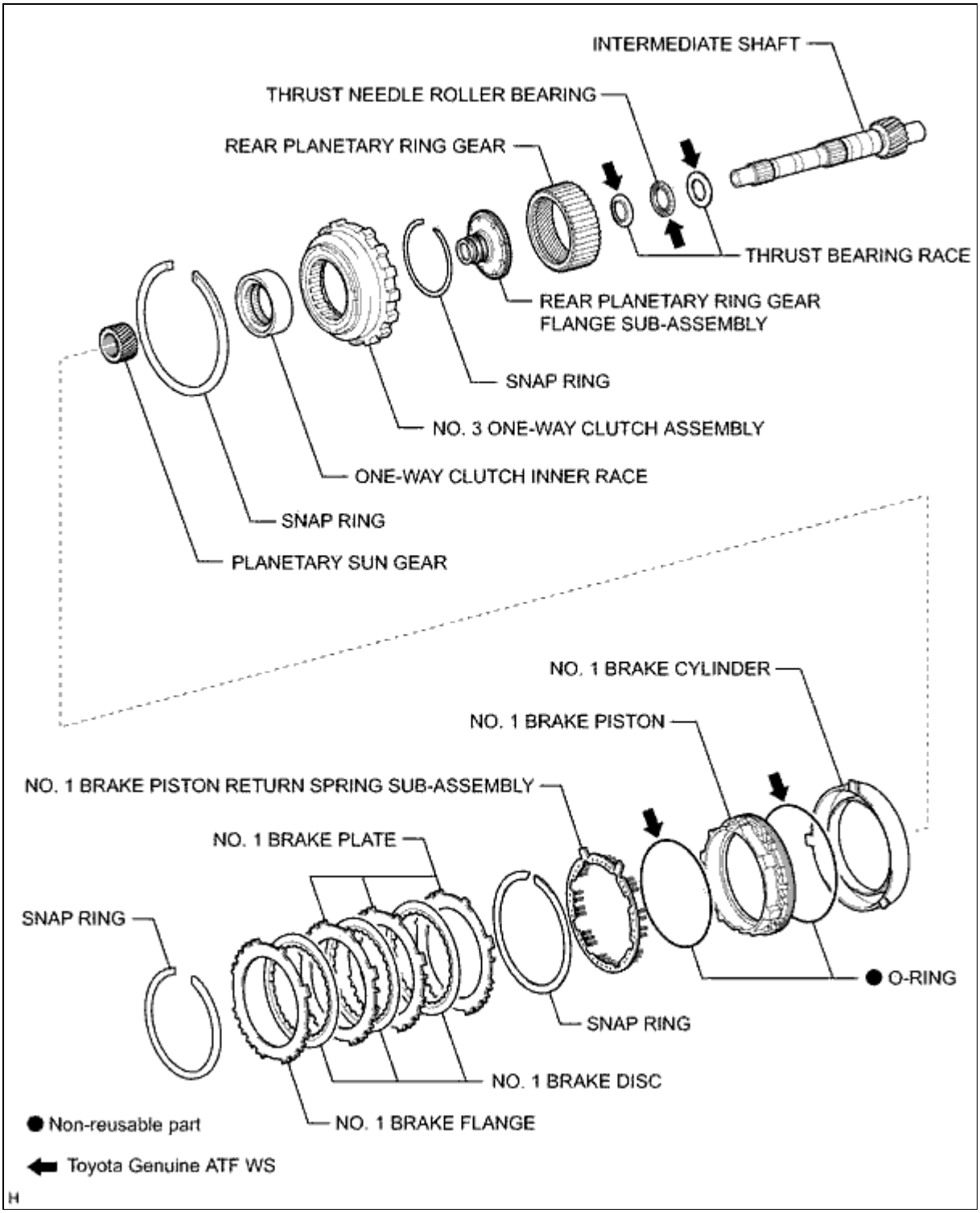
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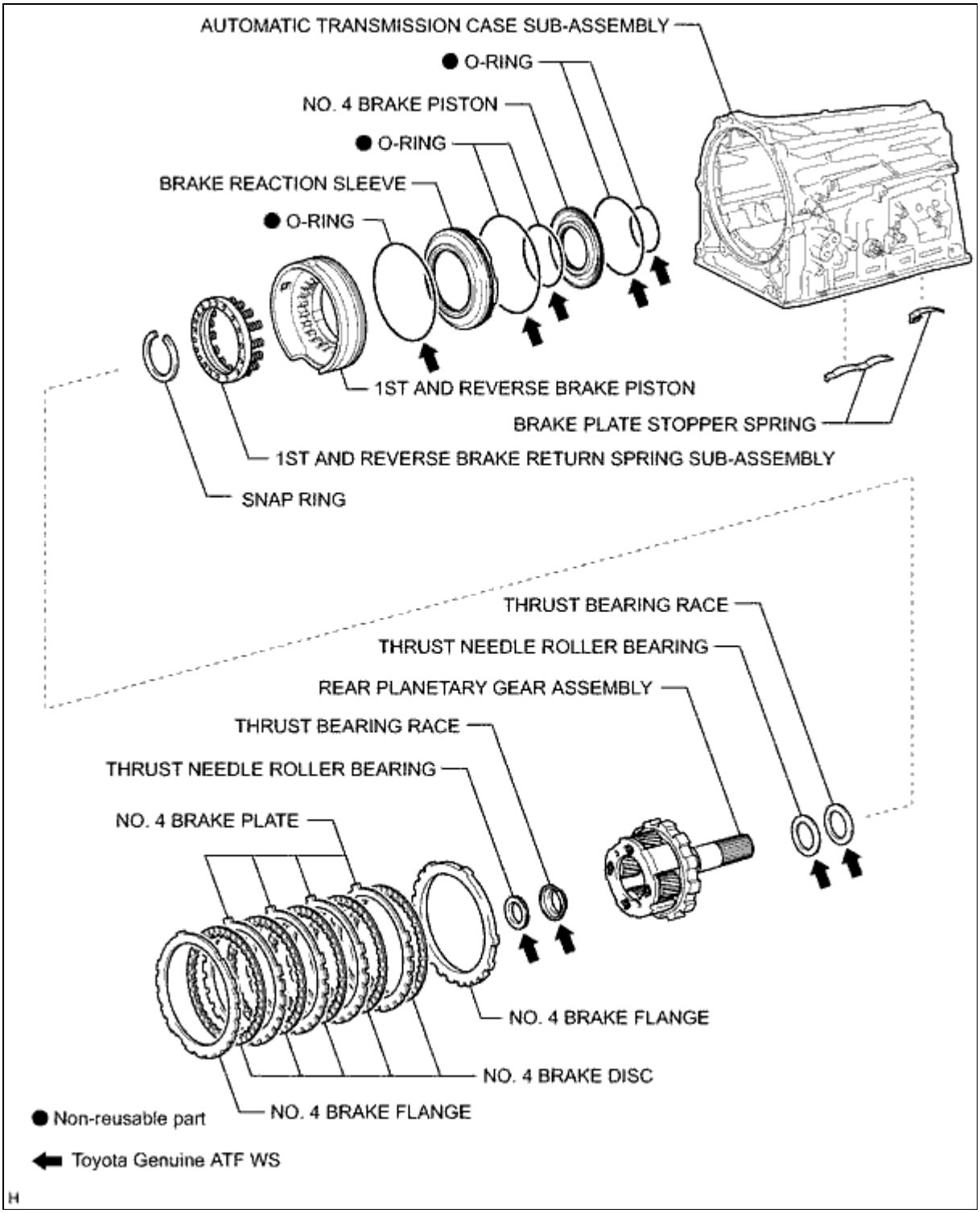
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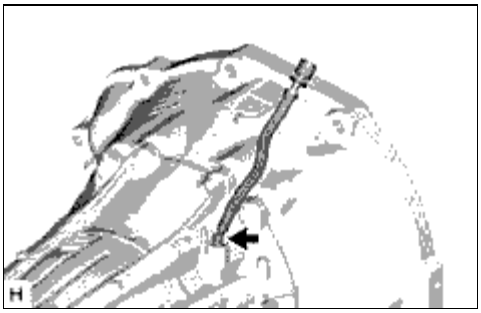
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9Z050X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

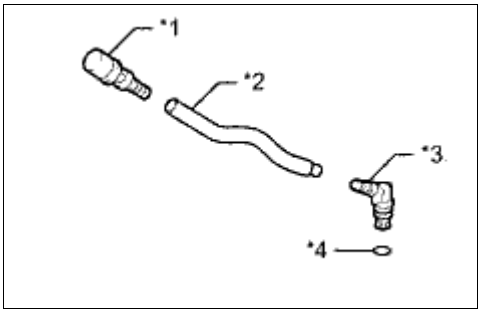
DISASSEMBLY

1. REMOVE BREATHER PLUG HOSE

(a) Remove the breather plug hose from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the breather plug.



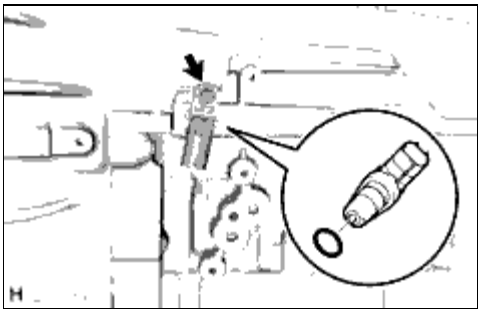
Text in Illustration

*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring

(c) Remove the breather plug sub-assembly and breather plug from the breather plug hose.

2. REMOVE TRANSMISSION REVOLUTION SENSOR

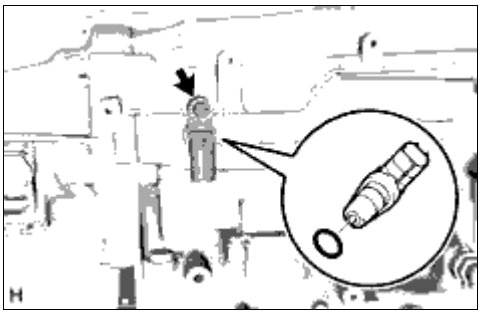
(a) Remove the bolt and transmission revolution sensor (NT) from the automatic transmission case sub-assembly.



(b) Remove the O-ring from the transmission revolution sensor (NT).

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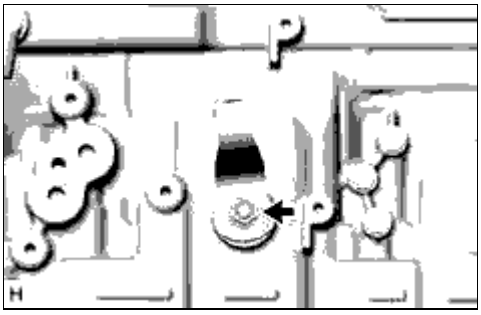
(c) Remove the bolt and transmission revolution sensor (SP2) from the automatic transmission case sub-assembly.



(d) Remove the O-ring from the transmission revolution sensor (SP2).

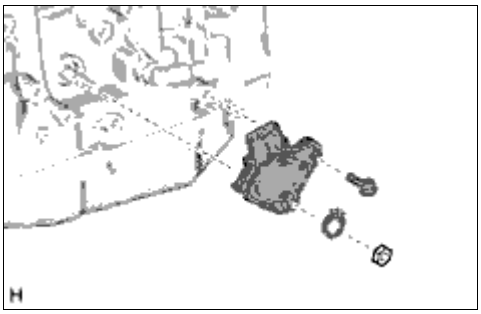
3. REMOVE TRANSMISSION CONTROL SHAFT LEVER LH

(a) Remove the nut, spring washer and transmission control shaft lever LH from the manual valve lever shaft.



4. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Using a screwdriver, bend the tabs of the lock washer.



(b) Remove the nut and the lock washer.

(c) Remove the bolt and park/neutral position switch from the automatic transmission case sub-assembly.

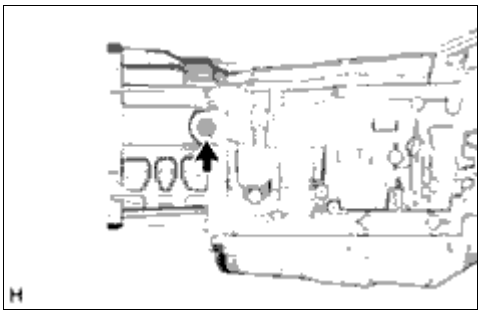
HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

5. REMOVE REFILL PLUG

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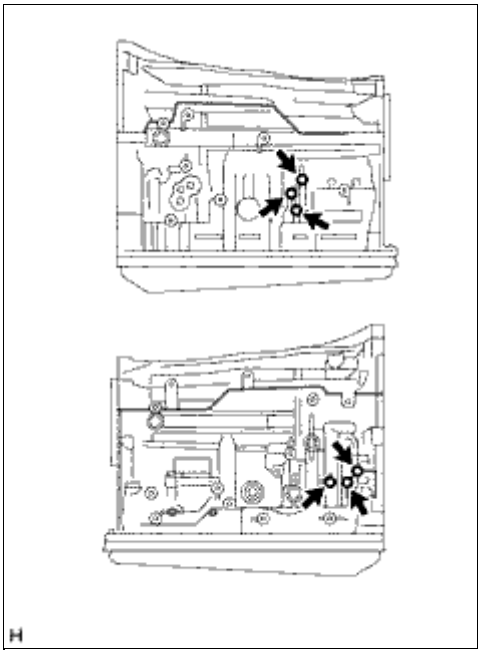
(a) Remove the refill plug from the rear transfer adapter.



(b) Remove the O-ring from the refill plug.

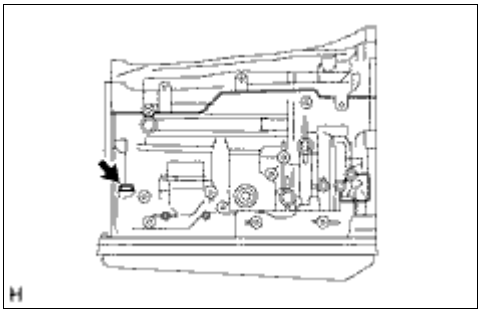
6. REMOVE AUTOMATIC TRANSMISSION CASE PLUG

(a) Remove the 6 automatic transmission case plugs from the automatic transmission case sub-assembly.



(b) Remove the 6 O-rings from the 6 automatic transmission case plugs.

(c) Using a T55 "TORX" socket wrench, remove the automatic transmission case plug from the automatic transmission case sub-assembly.

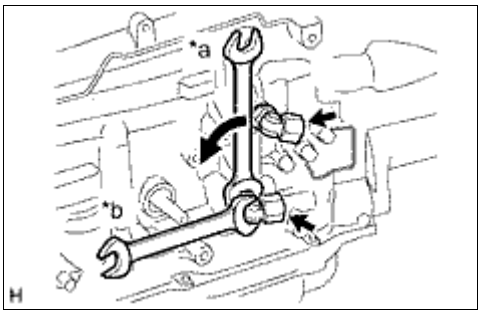


(d) Remove the O-ring from the automatic transmission case plug.

7. REMOVE OIL COOLER TUBE UNION

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(a) Remove the 2 oil cooler tube unions from the automatic transmission case sub-assembly.



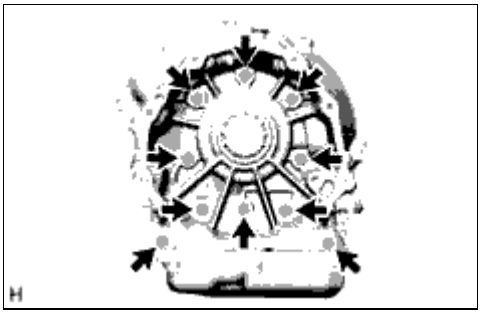
Text in Illustration

*a	Turn
*b	Hold

(b) Remove the 2 O-rings from the 2 oil cooler tube unions.

8. REMOVE REAR TRANSFER ADAPTER

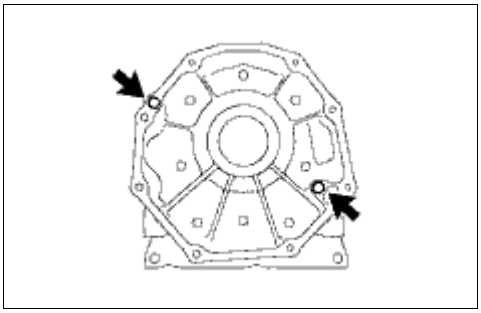
(a) Remove the 10 bolts and rear transfer adapter from the automatic transmission case sub-assembly.



HINT:

Use a brass bar and hammer to remove the rear transfer adapter.

(b) Remove the 2 straight pins from the rear transfer adapter.

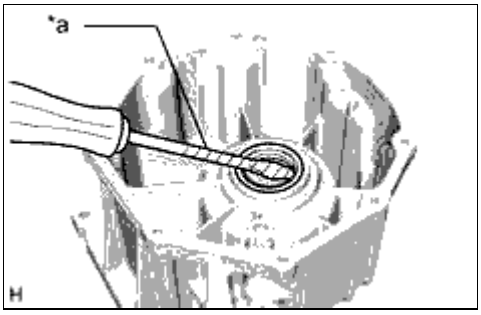


HINT:

It is not necessary to remove the straight pins they are being replaced.

9. REMOVE TRANSFER ADAPTER OIL SEAL

(a) Using a screwdriver, pry out the transfer adapter oil seal from the rear transfer adapter.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the rear transfer adapter.

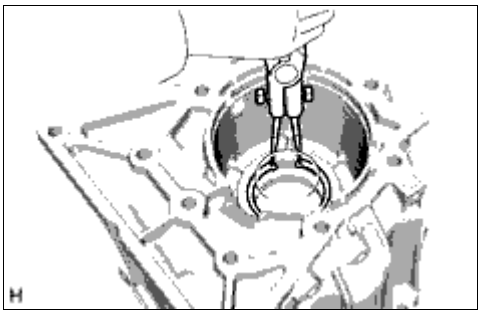
HINT:

Tape the screwdriver tip before use.

10. REMOVE REAR TRANSFER CASE ADAPTER OIL RECEIVER

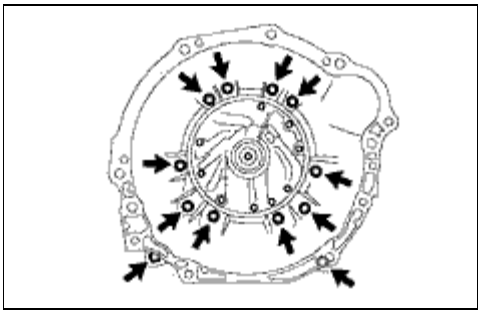
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(a) Using snap ring pliers, remove the snap ring and rear transfer case adapter oil receiver from the rear transfer adapter.



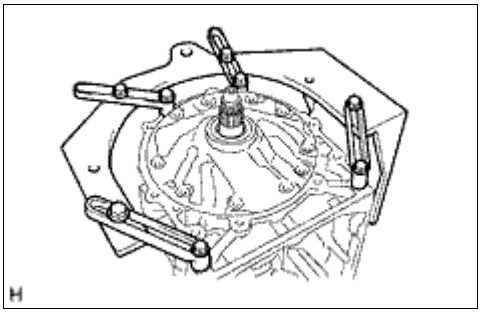
11. REMOVE AUTOMATIC TRANSMISSION HOUSING

(a) Remove the 12 bolts and automatic transmission housing from the automatic transmission case sub-assembly.



12. SECURE AUTOMATIC TRANSMISSION CASE SUB-ASSEMBLY

(a) Install the automatic transmission case sub-assembly to an overhaul attachment.



13. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

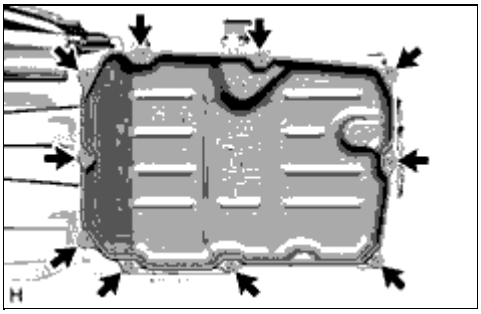
NOTICE:

Do not turn the transmission over as this will contaminate the transmission valve body assembly with foreign matter located at the bottom of the automatic transmission oil pan sub-assembly.

(a) Using a 5 mm socket hexagon wrench, remove the overflow plug and gasket.

(b) Remove the drain plug and gasket.

(c) Remove the 10 bolts, automatic transmission oil pan sub-assembly and automatic transmission oil pan gasket.



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(d) Remove the 4 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

(e) Examine the particles in the automatic transmission oil pan sub-assembly.

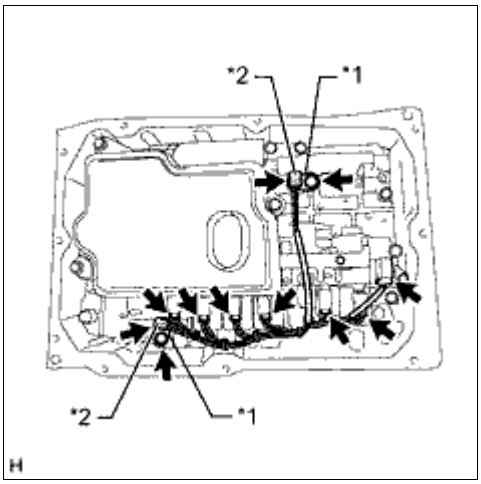
(1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.

Steel (magnetic): bearing, gear and clutch plate wear

Brass (non-magnetic): bush wear

14. REMOVE TRANSMISSION WIRE

(a) Remove the 2 bolts and 2 temperature sensor clamps, and disconnect the 2 temperature sensors.

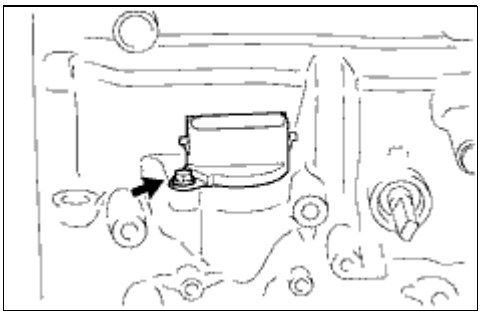


Text in Illustration

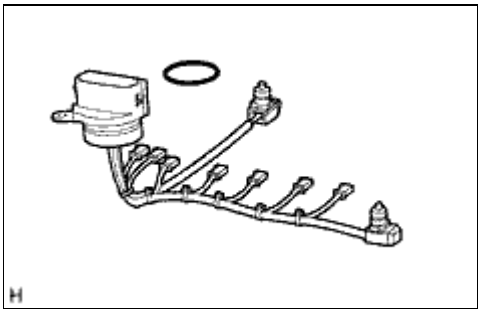
*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Disconnect the 7 solenoid valve connectors and transmission wire from the transmission valve body assembly.

(c) Remove the bolt and pull out the transmission wire from the automatic transmission case sub-assembly.

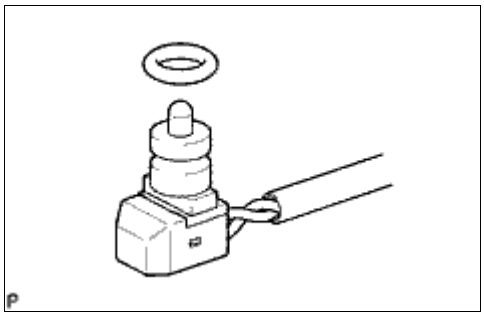


(d) Remove the O-ring from the connector of transmission wire.



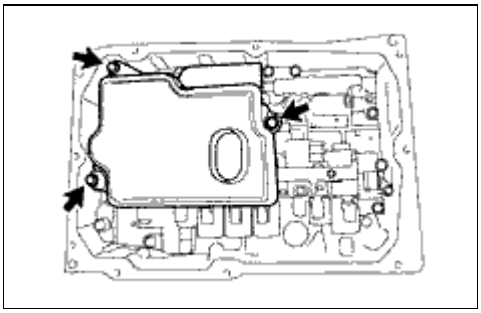
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(e) Remove the 2 O-rings from the 2 temperature sensors.



15. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

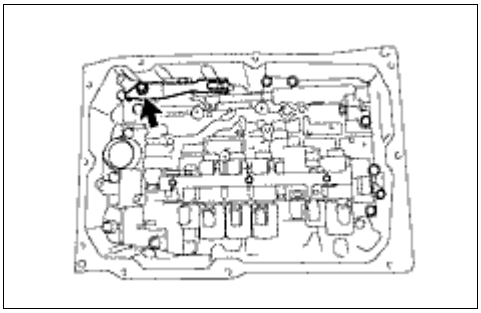
(a) Remove the 3 bolts and valve body oil strainer assembly from the transmission valve body assembly.



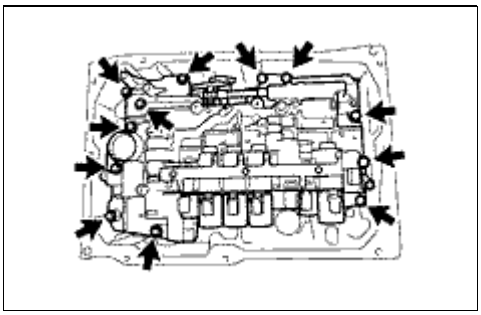
(b) Remove the O-ring from the valve body oil strainer assembly.

16. REMOVE TRANSMISSION VALVE BODY ASSEMBLY

(a) Remove the bolt, detent spring cover and detent spring from the transmission valve body assembly.



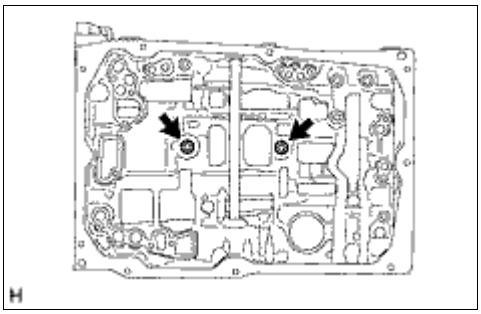
(b) Remove the 12 bolts and transmission valve body assembly from the automatic transmission case sub-assembly.



17. REMOVE TRANSMISSION CASE GASKET

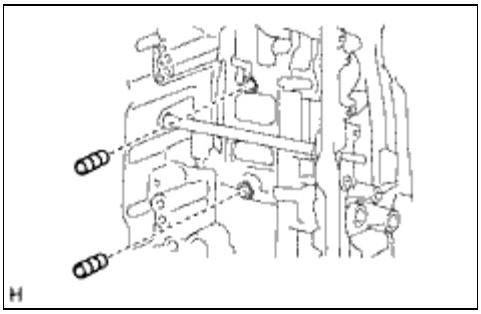
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(a) Remove the 2 transmission case gaskets from the automatic transmission case sub-assembly.



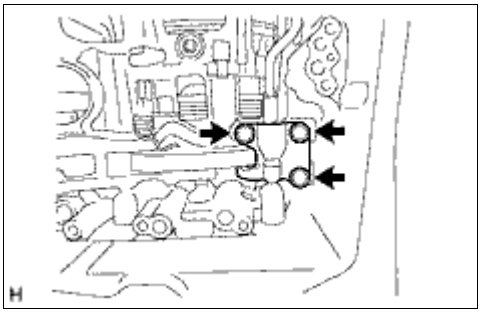
18. REMOVE BRAKE DRUM GASKET

(a) Remove the 2 brake drum gaskets from the automatic transmission case sub-assembly.



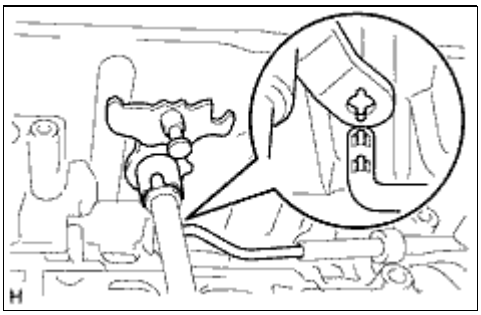
19. REMOVE PARKING LOCK PAWL BRACKET

(a) Remove the 3 bolts and parking lock pawl bracket from the automatic transmission case sub-assembly.



20. REMOVE PARKING LOCK ROD SUB-ASSEMBLY

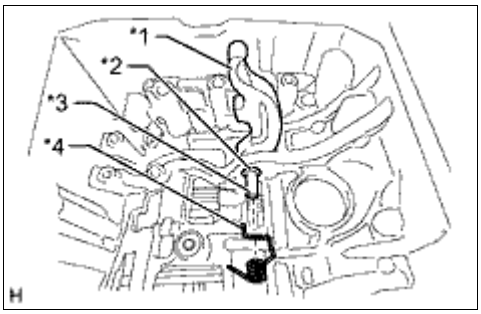
(a) Remove the parking lock rod sub-assembly from the manual valve lever sub-assembly.



21. REMOVE PARKING LOCK PAWL SHAFT

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(a) Pull out the parking lock pawl shaft from the front side, and remove the parking lock pawl and spring.



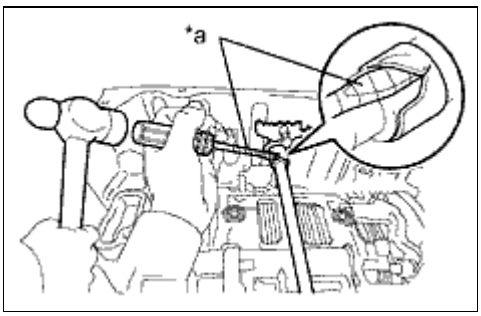
Text in Illustration

*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring

(b) Remove the E-ring from the parking lock pawl shaft.

22. REMOVE MANUAL VALVE LEVER SUB-ASSEMBLY

(a) Using a screwdriver and hammer, cut off the spacer and remove it from the manual valve lever shaft.



Text in Illustration

*a	Protective Tape

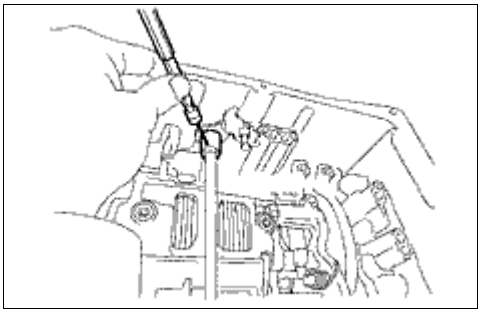
NOTICE:

Be careful not to damage the manual valve lever shaft.

HINT:

Tape the screwdriver tip before use.

(b) Using a 3 mm pin punch and hammer, drive out the spring pin.



HINT:

Slowly drive out the spring pin so that it does not fall into the automatic transmission case sub-assembly.

(c) Pull the manual valve lever shaft out through the case and remove the manual valve lever sub-assembly.

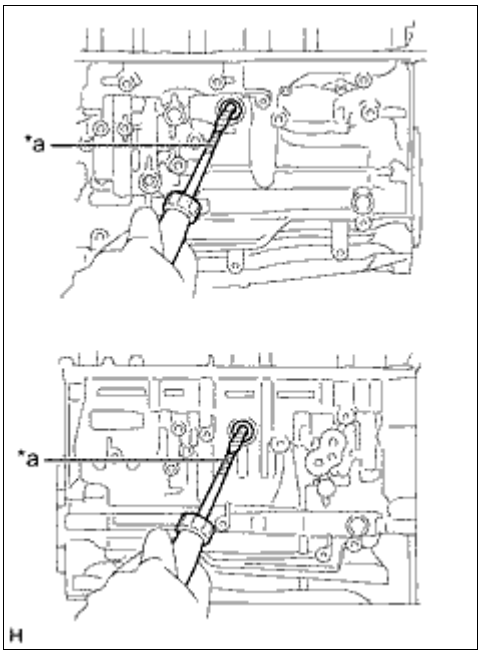
23. REMOVE MANUAL VALVE LEVER SHAFT OIL SEAL

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(a) Using a screwdriver, pry out the 2 manual valve lever shaft oil seals from the automatic transmission case sub-assembly.

Text in Illustration

*a	Protective Tape



NOTICE:

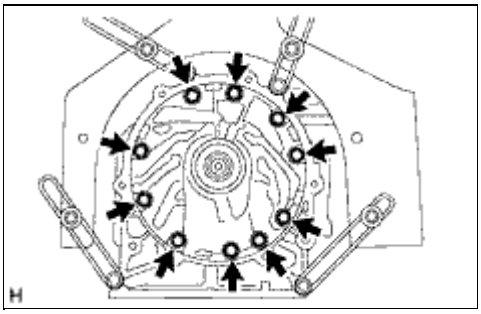
Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

24. REMOVE OIL PUMP ASSEMBLY

(a) Remove the 10 bolts.

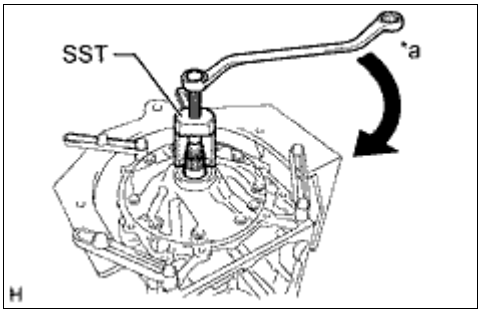


(b) Using SST, pull out the oil pump assembly from the automatic transmission case sub-assembly.

Text in Illustration

*a	Turn

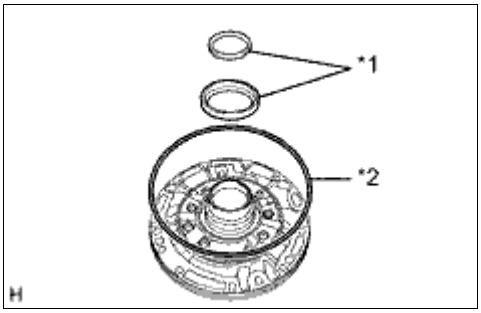
SST: 09610-20012



(c) Remove the 2 thrust bearing races from the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race
*2	Oil Pump O-ring

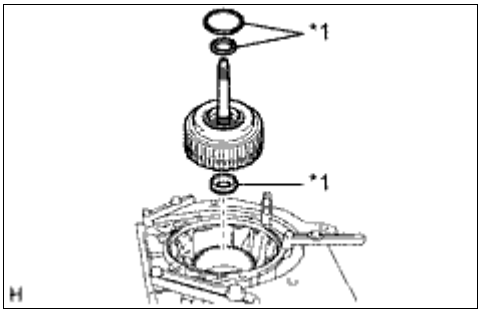


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(d) Remove the oil pump O-ring from the oil pump assembly.

25. REMOVE CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

(a) Remove the clutch drum and input shaft assembly from the automatic transmission case sub-assembly.



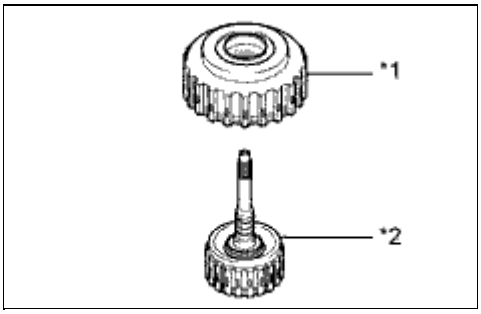
Text in Illustration

*1	Thrust Needle Roller Bearing

(b) Remove the 3 thrust needle roller bearings from the clutch drum and input shaft assembly.

26. REMOVE DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Remove the direct clutch drum sub-assembly from the input shaft sub-assembly.



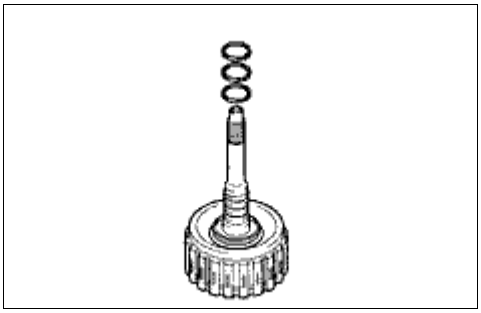
Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly

27. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH) INFO

28. REMOVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 3 clutch drum oil seal rings from the input shaft sub-assembly.



29. REMOVE NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Secure the input shaft sub-assembly in a vise between aluminum plates.

NOTICE:

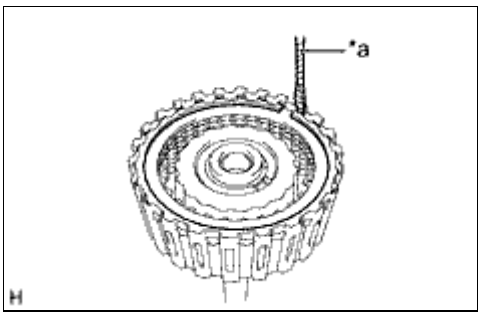
Do not overtighten the vise.

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(b) Using a screwdriver, remove the snap ring.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the input shaft sub-assembly.

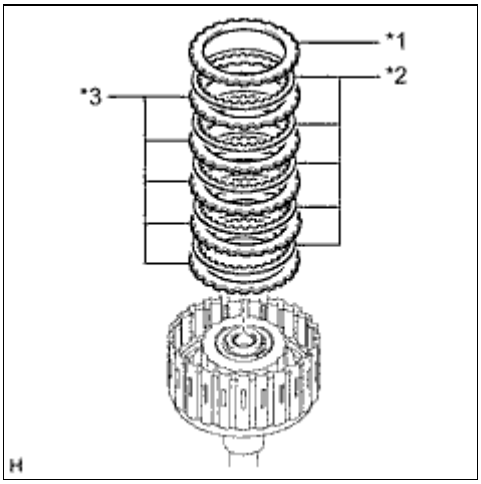
HINT:

Tape the screwdriver tip before use.

(c) Remove the forward clutch flange, 5 No. 1 clutch discs and 5 No. 1 clutch plates from the input shaft sub-assembly.

Text in Illustration

*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

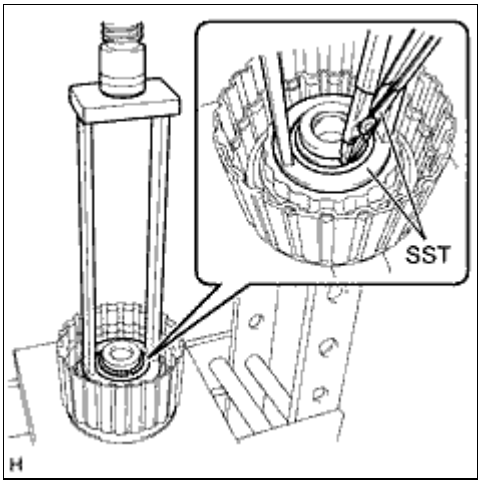


30. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC) INFO

31. REMOVE NO. 1 CLUTCH BALANCER

(a) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110



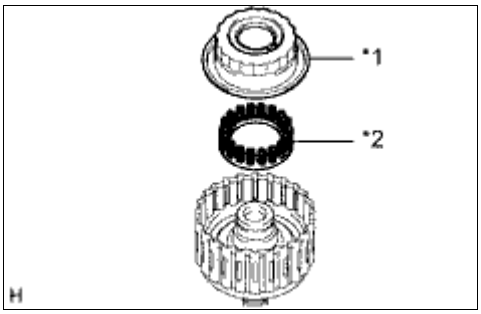
(b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070

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(c) Remove the No. 1 clutch balancer and forward clutch return spring sub-assembly from the input shaft sub-assembly.



Text in Illustration

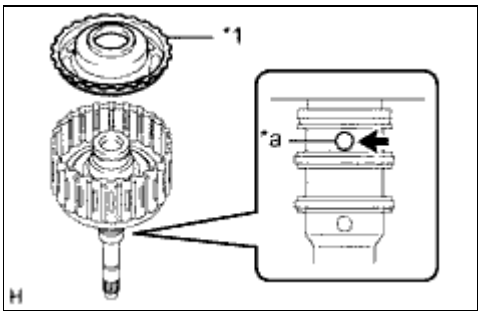
*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

(d) Remove the O-ring from the No. 1 clutch balancer.

32. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

33. REMOVE FORWARD CLUTCH PISTON

(a) While holding the forward clutch piston, apply compressed air to the oil hole of the input shaft sub-assembly to remove the forward clutch piston from the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Piston
*a	Oil Hole

(b) Remove the O-ring from the forward clutch piston.

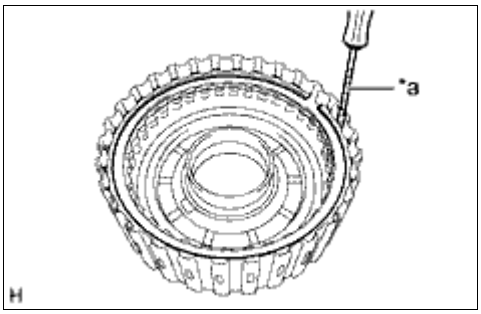
(c) Remove the O-ring from the input shaft sub-assembly.

34. INSPECT INPUT SHAFT SUB-ASSEMBLY INFO

35. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

36. REMOVE NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Using a screwdriver, remove the snap ring from the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

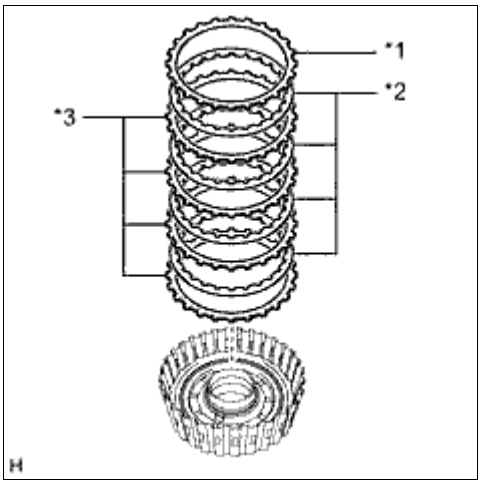
Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

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(b) Remove the direct clutch flange, 4 No. 2 clutch discs and 4 No. 2 clutch plates from the direct clutch drum sub-assembly.



Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

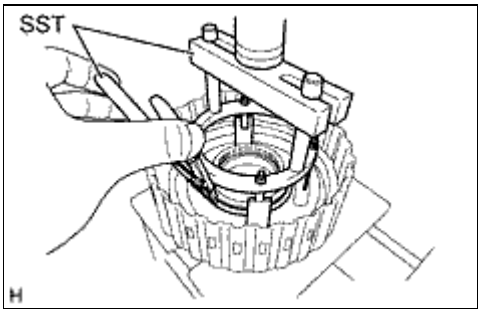
37. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC) INFO

38. REMOVE NO. 2 CLUTCH BALANCER

(a) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110

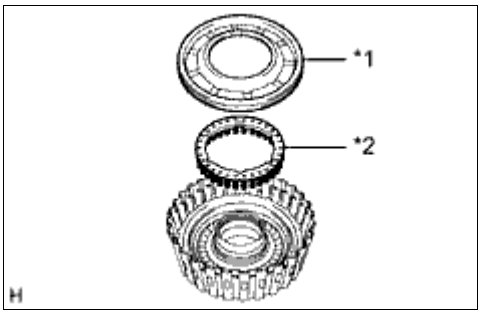


(b) Using SST, remove the snap ring.

SST: 09350-30020

09350-07070

(c) Remove the No. 2 clutch balancer and direct clutch return spring sub-assembly from the direct clutch drum sub-assembly.



Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly

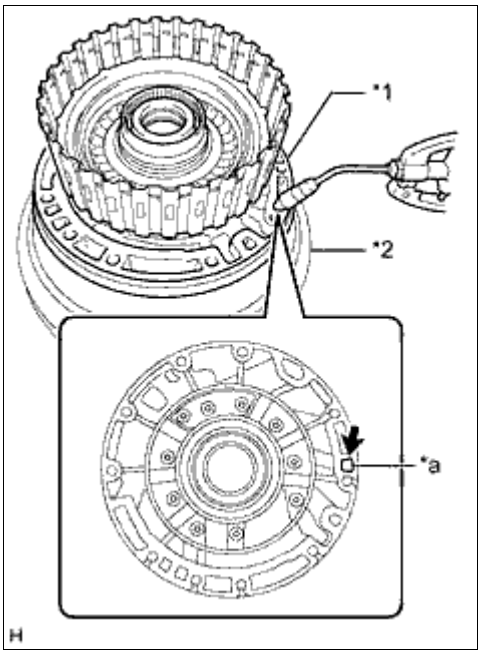
(d) Remove the O-ring from the No. 2 clutch balancer.

39. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY INFO

40. REMOVE DIRECT CLUTCH PISTON

cardiagn.com

(a) Place the oil pump assembly onto the torque converter assembly, and then place the direct clutch drum sub-assembly onto the oil pump assembly.



Text in Illustration

*1	Oil Pump Assembly
*2	Torque Converter Assembly
*a	Oil Hole

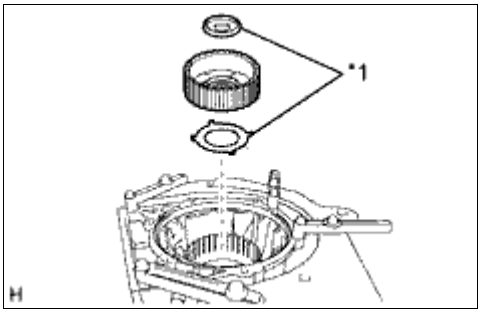
(b) While holding the direct clutch piston, apply compressed air to the oil hole of the oil pump assembly to remove the direct clutch piston from the direct clutch drum sub-assembly.

(c) Remove the 2 O-rings from the direct clutch piston.

41. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY INFO

42. REMOVE MULTIPLE DISC CLUTCH HUB

(a) Remove the multiple disc clutch hub from the automatic transmission case sub-assembly.



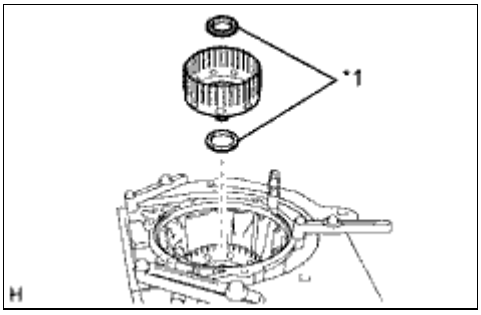
Text in Illustration

*1	Thrust Bearing Race

(b) Remove the 2 thrust bearing races from the multiple disc clutch hub.

43. REMOVE FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Remove the forward clutch hub sub-assembly from the automatic transmission case sub-assembly.



Text in Illustration

*1	Thrust Needle Roller Bearing

(b) Remove the 2 thrust needle roller bearings from the forward clutch hub sub-assembly.

cardiagn.com

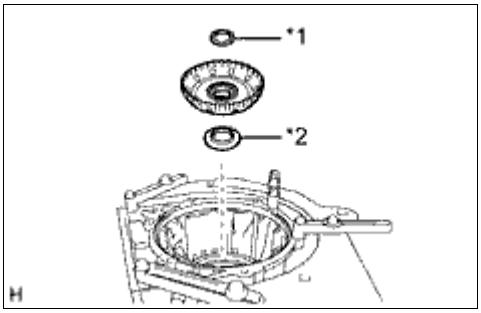
44. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY INFO

45. REMOVE SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Remove the sun gear input drum sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race
*2	Thrust Needle Roller Bearing



(b) Remove the thrust needle roller bearing and thrust bearing race from the sun gear input drum sub-assembly.

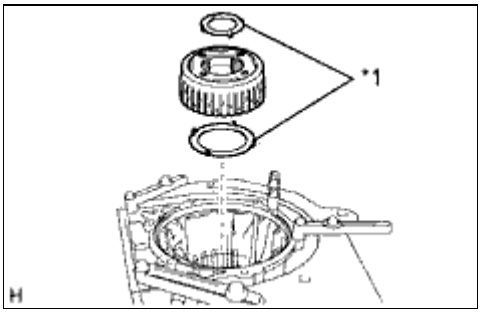
46. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY INFO

47. REMOVE FRONT PLANETARY GEAR ASSEMBLY

(a) Remove the front planetary gear assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Bearing Race



(b) Remove the 2 thrust bearing races from the front planetary gear assembly.

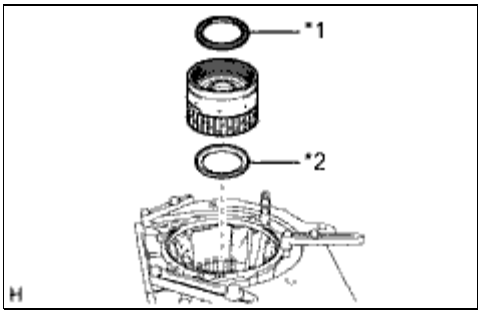
48. INSPECT FRONT PLANETARY GEAR ASSEMBLY INFO

49. REMOVE FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Remove the front planetary ring gear with front planetary ring gear flange sub-assembly from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race

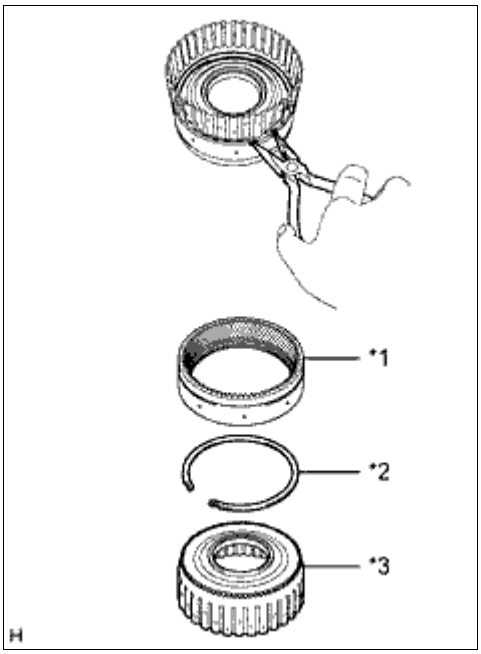


(b) Remove the thrust needle roller bearing and thrust bearing race from the front planetary ring gear with front planetary ring gear flange sub-assembly.

50. REMOVE FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

cardiagn.com

(a) Using needle-nose pliers, remove the snap ring and front planetary ring gear flange sub-assembly from the front planetary ring gear.



Text in Illustration

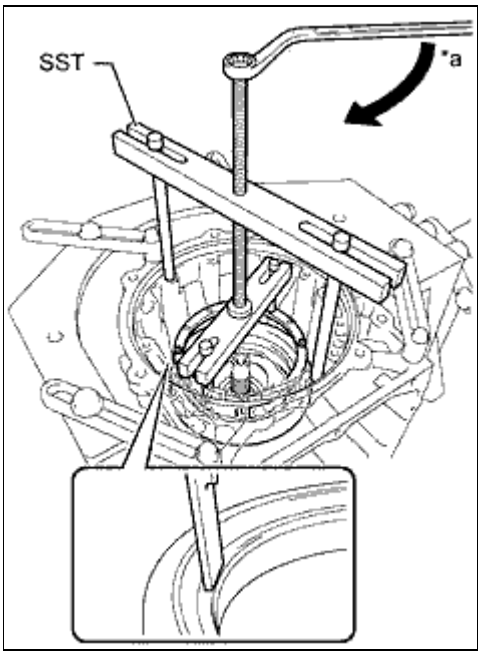
*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly

51. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

52. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

53. REMOVE NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06020
09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

NOTICE:

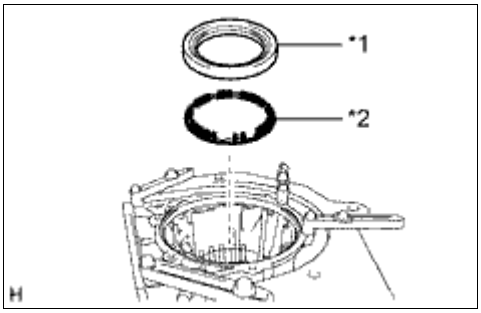
Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

cardiagn.com

(c) Remove the No. 2 brake cylinder with No. 2 brake piston and No. 2 brake piston return spring sub-assembly from the automatic transmission case sub-assembly.



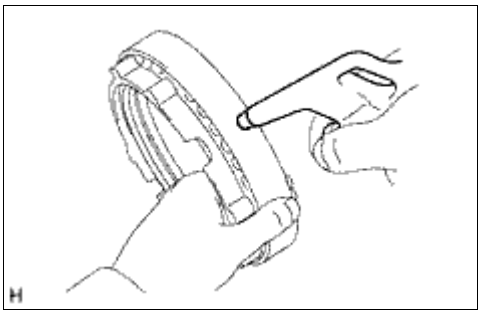
Text in Illustration

*1	No. 2 Brake Cylinder with No. 2 Brake Piston
*2	No. 2 Brake Piston Return Spring Sub-assembly

54. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

55. REMOVE NO. 2 BRAKE PISTON

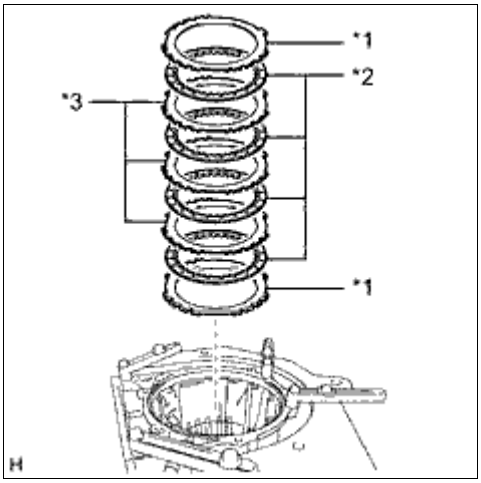
(a) While holding the No. 2 brake piston, apply compressed air to the oil hole of the No. 2 brake cylinder to remove the No. 2 brake piston from the No. 2 brake cylinder.



(b) Remove the 2 O-rings from the No. 2 brake piston.

56. REMOVE NO. 2 BRAKE DISC

(a) Remove the 2 No. 2 brake flanges, 4 No. 2 brake discs and 3 No. 2 brake plates from the automatic transmission case sub-assembly.



Text in Illustration

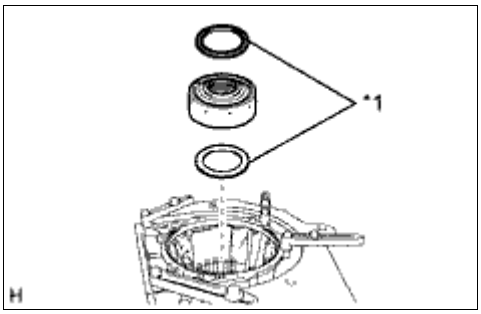
*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate

57. INSPECT NO. 2 BRAKE DISC INFO

58. REMOVE CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

cardiagn.com

(a) Remove the center planetary ring gear flange with center planetary ring gear from the automatic transmission case sub-assembly.



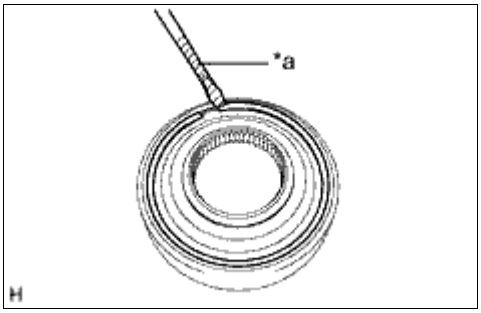
Text in Illustration

*1	Thrust Needle Roller Bearing

(b) Remove the 2 thrust needle roller bearings from the center planetary ring gear flange with center planetary ring gear.

59. REMOVE CENTER PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring from the center planetary ring gear flange with center planetary ring gear.



Text in Illustration

*a	Protective Tape

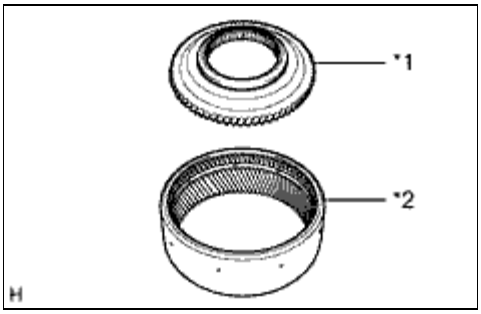
NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

HINT:

Tape the screwdriver tip before use.

(b) Remove the center planetary ring gear from the center planetary ring gear flange.

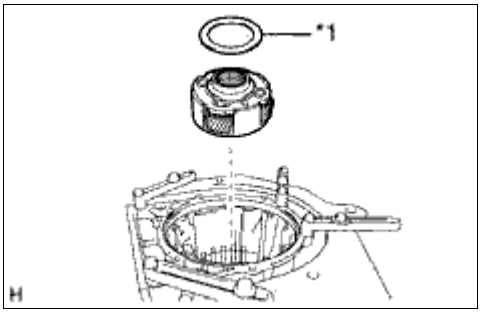


Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

60. REMOVE CENTER PLANETARY GEAR ASSEMBLY

(a) Remove the center planetary gear assembly from the automatic transmission case sub-assembly.



Text in Illustration

*1	Thrust Bearing Race

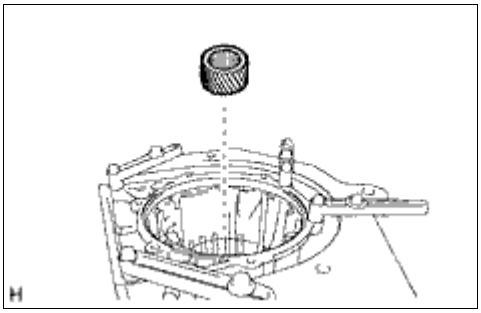
(b) Remove the thrust bearing race from the center planetary gear assembly.

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61. INSPECT CENTER PLANETARY GEAR ASSEMBLY INFO

62. REMOVE PLANETARY SUN GEAR

(a) Remove the planetary sun gear from the automatic transmission case sub-assembly.



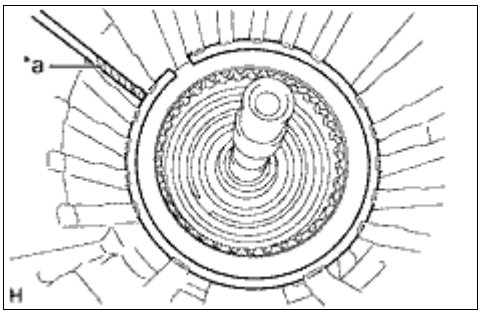
63. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

64. REMOVE NO. 1 BRAKE DISC

(a) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

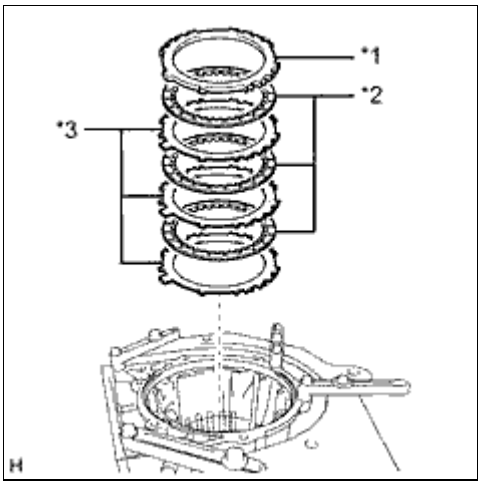
HINT:

Tape the screwdriver tip before use.

(b) Remove the No. 1 brake flange, 3 No. 1 brake discs and 3 No. 1 brake plates from the automatic transmission case sub-assembly.

Text in Illustration

*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

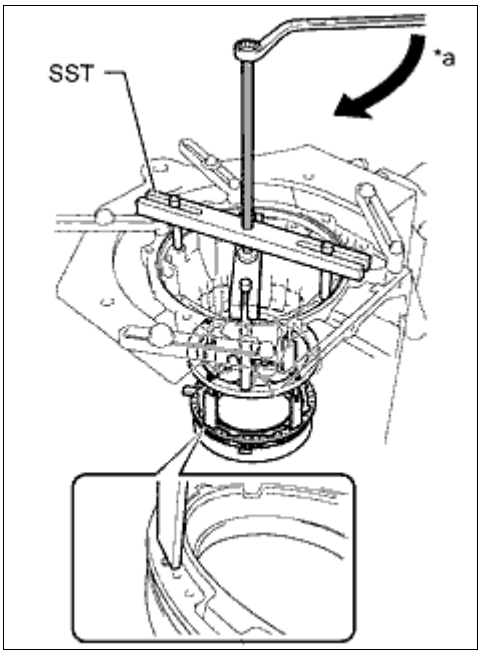


65. INSPECT NO. 1 BRAKE DISC INFO

66. REMOVE NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

cardiagn.com

(a) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06040
09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(b) Using a screwdriver, remove the snap ring from the automatic transmission case sub-assembly.

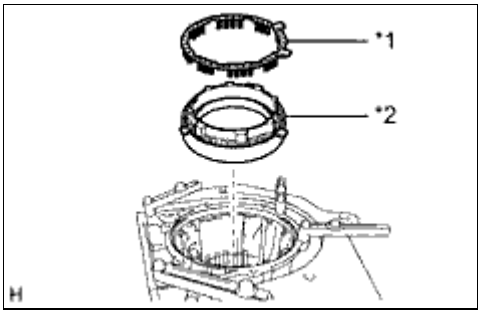
NOTICE:

Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

(c) Remove the No. 1 brake piston return spring sub-assembly and No. 1 brake cylinder with No. 1 brake piston from the automatic transmission case sub-assembly.



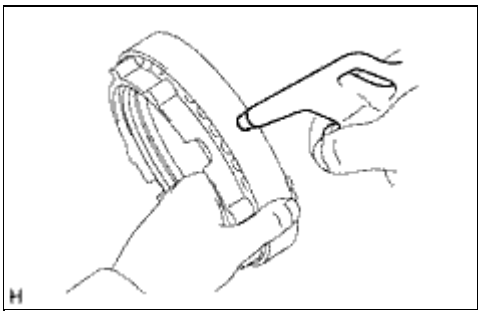
Text in Illustration

*1	No. 1 Brake Piston Return Spring Sub-assembly
*2	No. 1 Brake Cylinder with No. 1 Brake Piston

67. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY INFO

68. REMOVE NO. 1 BRAKE PISTON

(a) While holding the No. 1 brake piston, apply compressed air to the oil hole of the No. 1 brake cylinder to remove the No. 1 brake piston from the No. 1 brake cylinder.



(b) Remove the 2 O-rings from the No. 1 brake piston.

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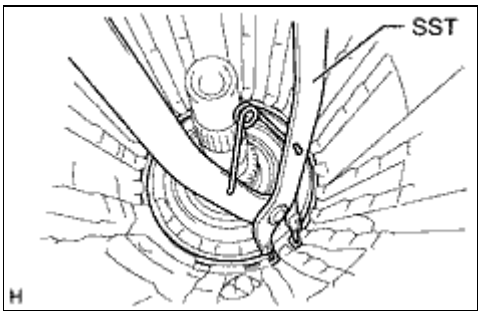
69. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

70. REMOVE INTERMEDIATE SHAFT WITH NO. 3 ONE-WAY CLUTCH ASSEMBLY AND REAR PLANETARY RING GEAR

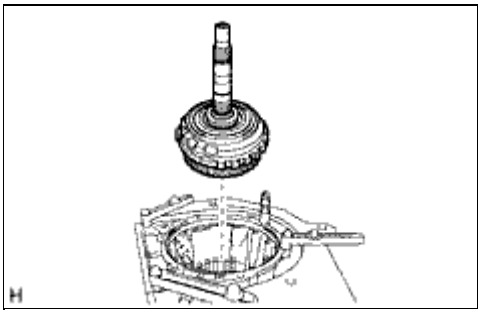
(a) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07060



(b) Remove the intermediate shaft with No. 3 one-way clutch assembly and rear planetary ring gear from the automatic transmission case sub-assembly.



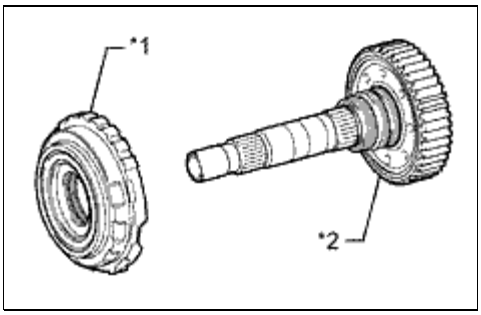
71. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY INFO

72. REMOVE NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Remove the No. 3 one-way clutch assembly with one-way clutch inner race from the intermediate shaft with rear planetary ring gear.

Text in Illustration

*1	No. 3 One-way Clutch Assembly with One-way Clutch Inner Race
*2	Intermediate Shaft with Rear Planetary Ring Gear

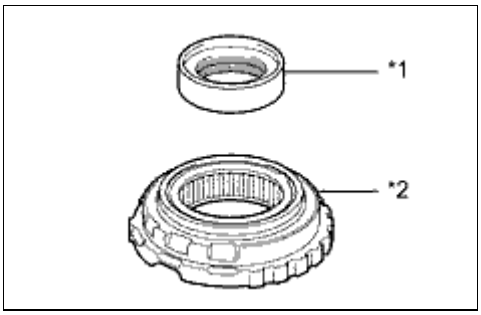


73. REMOVE ONE-WAY CLUTCH INNER RACE

(a) Remove the one-way clutch inner race from the No. 3 one-way clutch assembly.

Text in Illustration

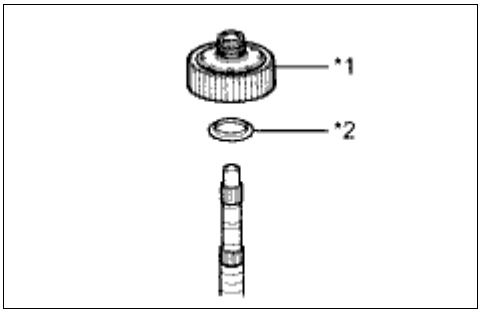
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly



74. REMOVE REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

cardiagn.com

(a) Remove the rear planetary ring gear flange sub-assembly with rear planetary ring gear from the intermediate shaft.

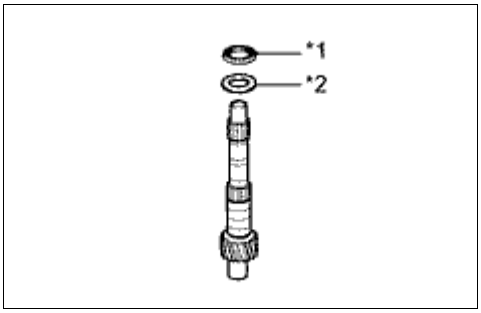


Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly with Rear Planetary Ring Gear
*2	Thrust Bearing Race

(b) Remove the thrust bearing race from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

(c) Remove the thrust needle roller bearing and thrust bearing race from the intermediate shaft.



Text in Illustration

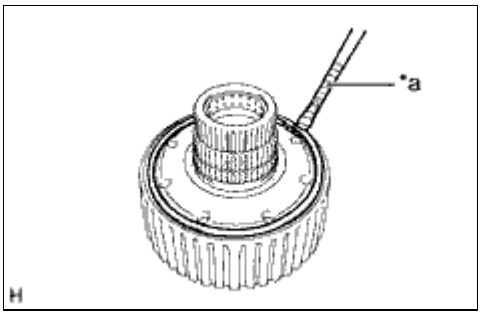
*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race

75. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY INFO

76. INSPECT INTERMEDIATE SHAFT INFO

77. REMOVE REAR PLANETARY RING GEAR

(a) Using a screwdriver, remove the snap ring from the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

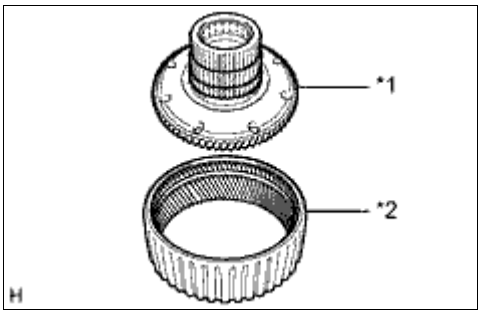
Tape the screwdriver tip before use.

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(b) Remove the rear planetary ring gear from the rear planetary ring gear flange sub-assembly.

Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

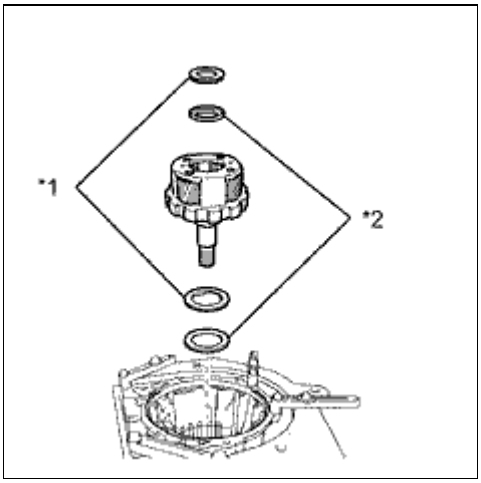


78. REMOVE REAR PLANETARY GEAR ASSEMBLY WITH NO. 4 BRAKE DISC

(a) Remove the rear planetary gear assembly with No. 4 brake disc from the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing
*2	Thrust Bearing Race



(b) Remove the 2 thrust needle roller bearings and thrust bearing race from the rear planetary gear assembly with No. 4 brake disc.

(c) Remove the thrust bearing race from the automatic transmission case sub-assembly.

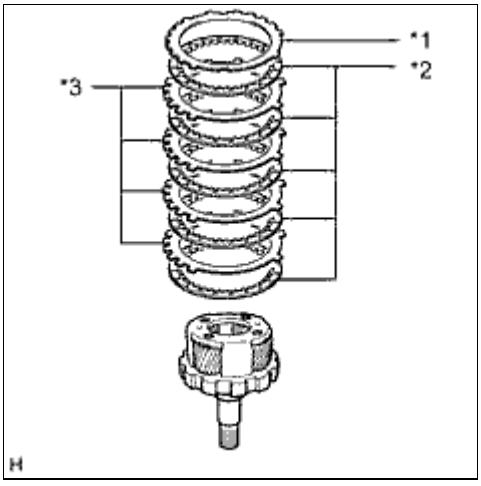
79. INSPECT REAR PLANETARY GEAR ASSEMBLY INFO

80. REMOVE NO. 4 BRAKE DISC

(a) Remove the No. 4 brake flange, 5 No. 4 brake discs and 4 No. 4 brake plates from the rear planetary gear assembly.

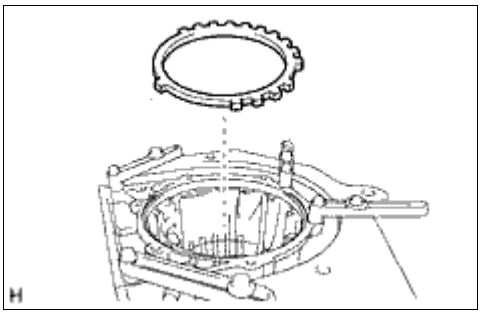
Text in Illustration

*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate



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(b) Remove the No. 4 brake flange from the automatic transmission case sub-assembly.



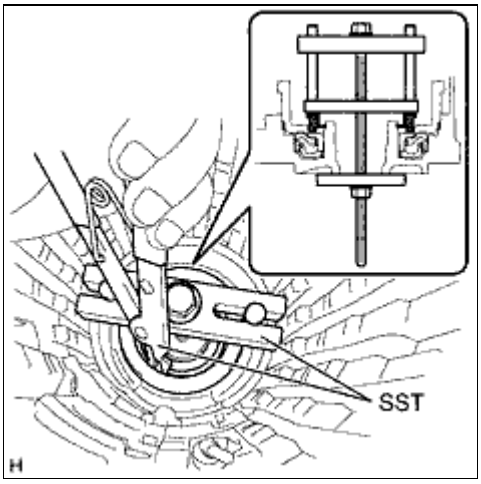
81. INSPECT NO. 4 BRAKE DISC INFO

82. REMOVE 1ST AND REVERSE BRAKE PISTON

(a) Place SST on the 1st and reverse brake return spring sub-assembly and compress the 1st and reverse brake return spring sub-assembly.

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

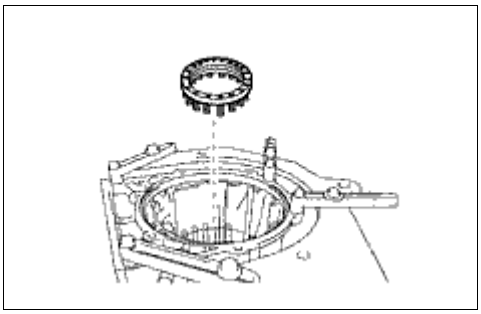


(b) Using SST, remove the snap ring from the automatic transmission case sub-assembly.

SST: 09350-30020

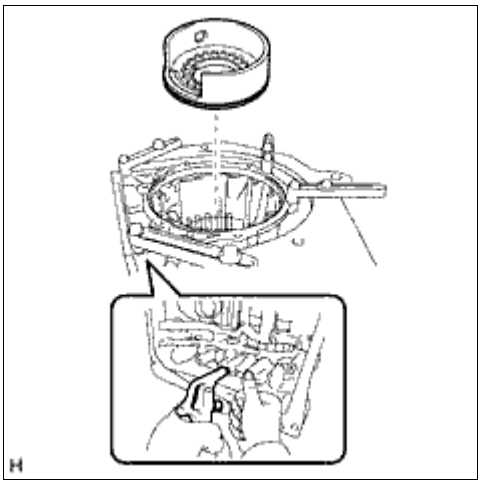
09350-07070

(c) Remove the 1st and reverse brake return spring sub-assembly from the automatic transmission case sub-assembly.



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(d) Apply compressed air to the oil hole of the automatic transmission case sub-assembly to remove the 1st and reverse brake piston from the automatic transmission case sub-assembly.



(e) Remove the O-ring from the 1st and reverse brake piston.

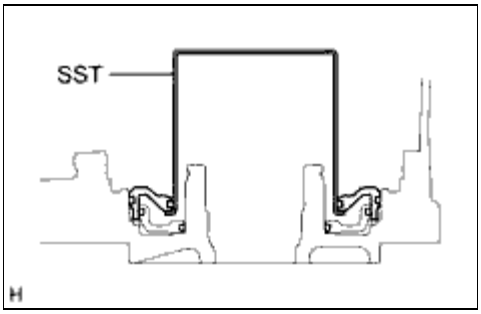
83. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY INFO

84. REMOVE BRAKE REACTION SLEEVE

(a) Using SST, remove the brake reaction sleeve from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07080



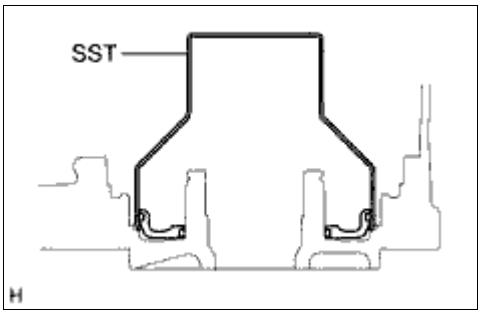
(b) Remove the 2 O-rings from the brake reaction sleeve.

85. REMOVE NO. 4 BRAKE PISTON

(a) Using SST, remove the No. 4 brake piston from the automatic transmission case sub-assembly.

SST: 09350-30020

09350-07090

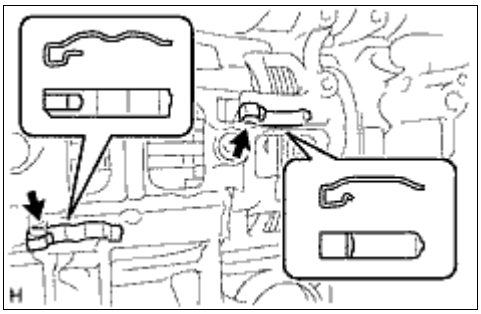


(b) Remove the 2 O-rings from the No. 4 brake piston.

86. REMOVE BRAKE PLATE STOPPER SPRING

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(a) Remove the 2 brake plate stopper springs from the automatic transmission case sub-assembly.



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000O9W057X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): INSPECTION; 2016 MY Tacoma [08/2015 -]		

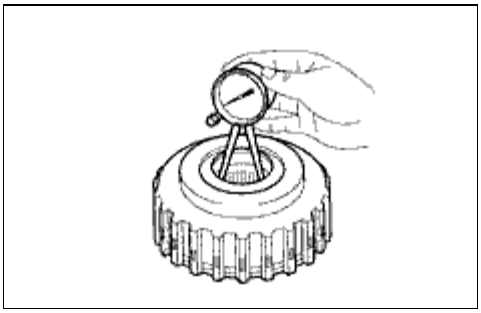
INSPECTION

1. INSPECT DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the direct clutch drum sub-assembly bushing.

Standard inside diameter:
59.515 to 59.540 mm (2.3432 to 2.3440 in.)

If the inside diameter is not as specified, replace the direct clutch drum sub-assembly.

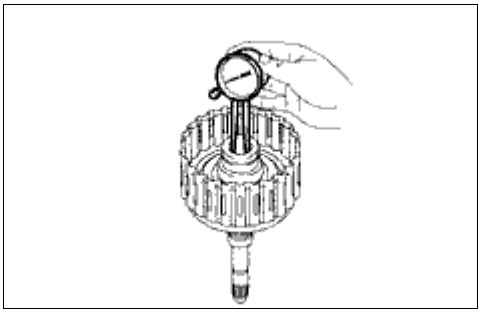


2. INSPECT INPUT SHAFT SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the input shaft sub-assembly bushing.

Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the input shaft sub-assembly.

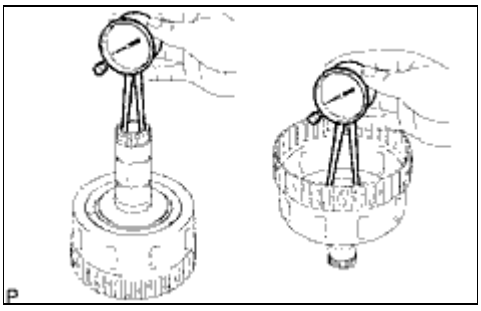


3. INSPECT FORWARD CLUTCH HUB SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the forward clutch hub sub-assembly bushing.

Standard inside diameter:
26.037 to 26.062 mm (1.0251 to 1.0260 in.)

If the inside diameter is not as specified, replace the forward clutch hub sub-assembly.



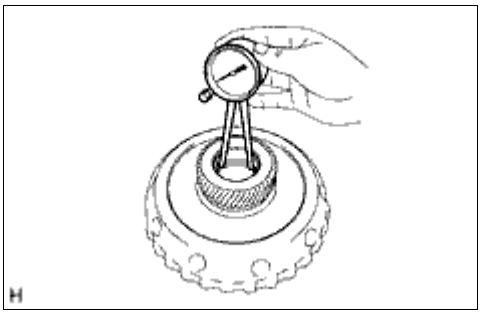
4. INSPECT SUN GEAR INPUT DRUM SUB-ASSEMBLY

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(a) Using a caliper gauge, measure the inside diameter of the sun gear input drum sub-assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the sun gear input drum sub-assembly.

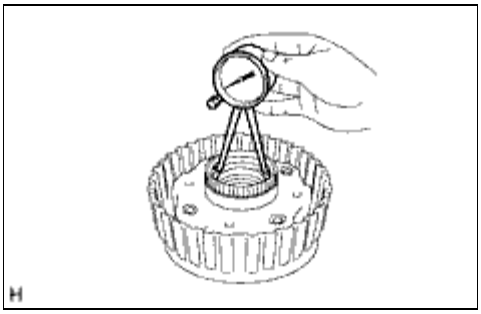


5. INSPECT FRONT PLANETARY GEAR ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary gear assembly bushing.

Standard inside diameter:
35.811 to 35.835 mm (1.4099 to 1.4108 in.)

If the inside diameter is not as specified, replace the front planetary gear assembly.

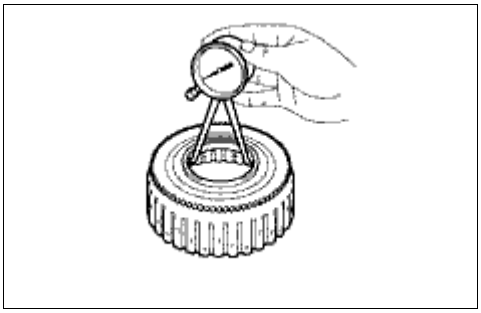


6. INSPECT FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the front planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
54.038 to 54.063 mm (2.1275 to 2.1284 in.)

If the inside diameter is not as specified, replace the front planetary ring gear flange sub-assembly.

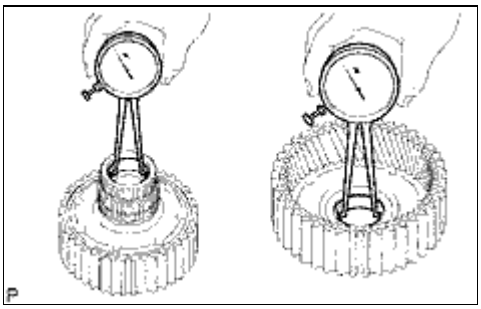


7. INSPECT REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the rear planetary ring gear flange sub-assembly bushing.

Standard inside diameter:
32.176 to 32.201 mm (1.2668 to 1.2677 in.)

If the inside diameter is not as specified, replace the rear planetary ring gear flange sub-assembly.



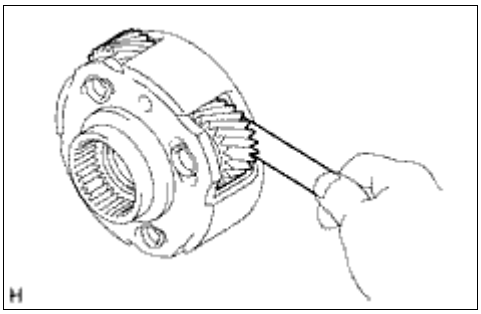
8. INSPECT CENTER PLANETARY GEAR ASSEMBLY

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(a) Using a feeler gauge, measure the center planetary gear pinion thrust clearance.

Standard clearance:
0.12 to 0.68 mm (0.00473 to 0.0267 in.)

If the clearance is not as specified, replace the center planetary gear assembly.

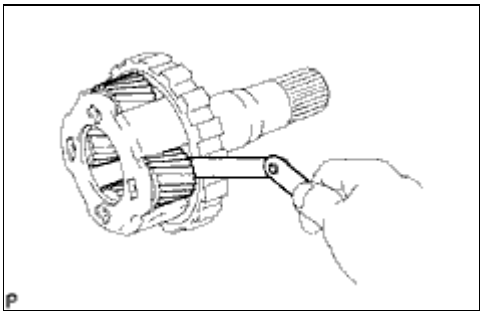


9. INSPECT REAR PLANETARY GEAR ASSEMBLY

(a) Using a feeler gauge, measure the rear planetary gear pinion thrust clearance.

Standard clearance:
0.2 to 0.6 mm (0.00788 to 0.0236 in.)

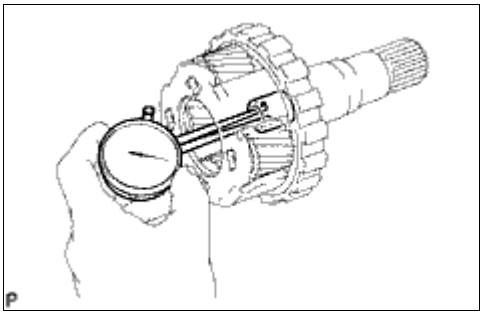
If the clearance is not as specified, replace the rear planetary gear assembly.



(b) Using a caliper gauge, measure the inside diameter of the rear planetary gear bushing.

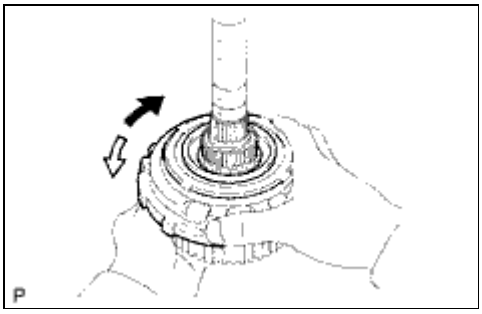
Standard inside diameter:
20.000 to 20.025 mm (0.7874 to 0.7883 in.)

If the inside diameter is not as specified, replace the rear planetary gear assembly.



10. INSPECT NO. 3 ONE-WAY CLUTCH ASSEMBLY

(a) Hold the rear planetary ring gear and turn the No. 3 one-way clutch assembly.



Text in Illustration

➡	Lock
⇨	Free

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(b) Check that the No. 3 one-way clutch assembly turns freely when turned counterclockwise and locks when turned clockwise.

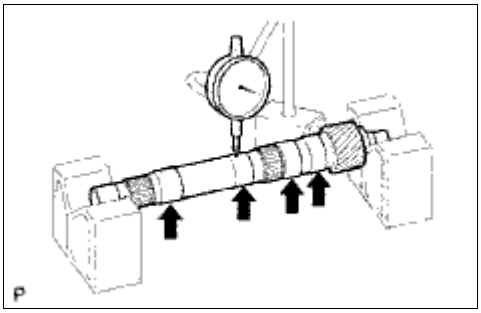
If there is a problem with the No. 3 one-way clutch assembly, replace it.

11. INSPECT INTERMEDIATE SHAFT

(a) Using a dial indicator and V-blocks, check the intermediate shaft runout.

Standard runout:
0.03 mm (0.00118 in.)

If the runout is more than the standard, replace the intermediate shaft with a new one.



(b) Using a micrometer, check the outer diameter of the intermediate shaft at each point shown in the illustration.

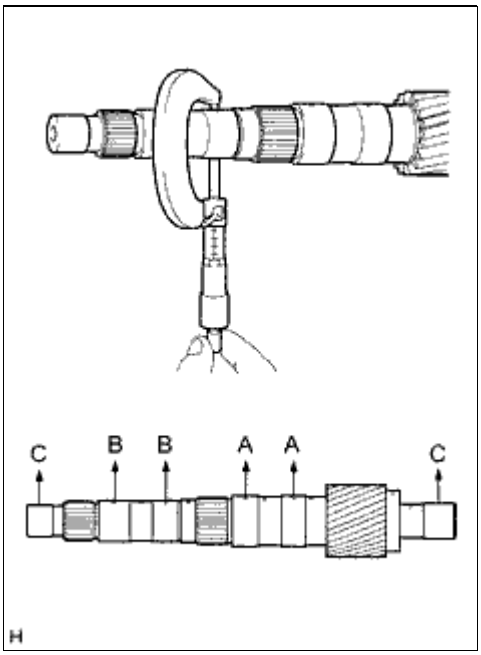
Standard diameter:

A
32.062 to 32.075 mm (1.2623 to 1.2627 in.)

B
25.962 to 25.975 mm (1.0222 to 1.0226 in.)

C
19.963 to 19.976 mm (0.7860 to 0.7864 in.)

If the outer diameter is more than the standard, replace the intermediate shaft with a new one.

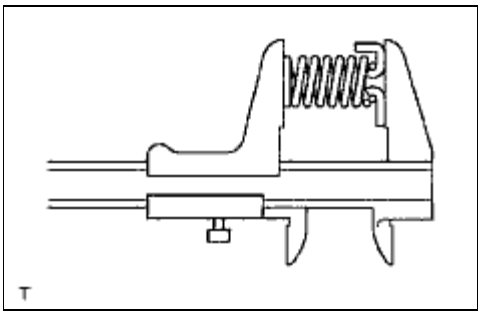


12. INSPECT FORWARD CLUTCH RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the forward clutch return spring sub-assembly including the spring seat.

Standard free length:
26.74 mm (1.053 in.)

If the free length is more than the standard free length, replace the forward clutch return spring sub-assembly.



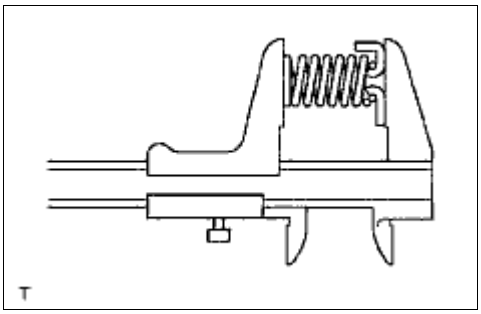
13. INSPECT DIRECT CLUTCH RETURN SPRING SUB-ASSEMBLY

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(a) Using a vernier caliper, measure the free length of the direct clutch return spring sub-assembly including the spring seat.

Standard free length:
22.14 mm (0.872 in.)

If the free length is more than the standard free length, replace the direct clutch return spring sub-assembly.

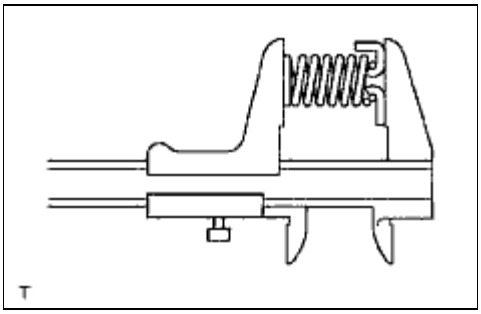


14. INSPECT NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 1 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.72 mm (0.658 in.)

If the free length is more than the standard free length, replace the No. 1 brake piston return spring sub-assembly.

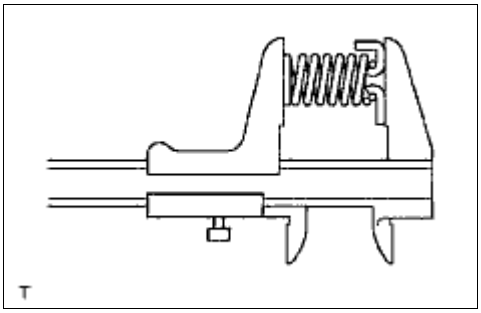


15. INSPECT NO. 2 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the No. 2 brake piston return spring sub-assembly including the spring seat.

Standard free length:
16.68 mm (0.657 in.)

If the free length is more than the standard free length, replace the No. 2 brake piston return spring sub-assembly.

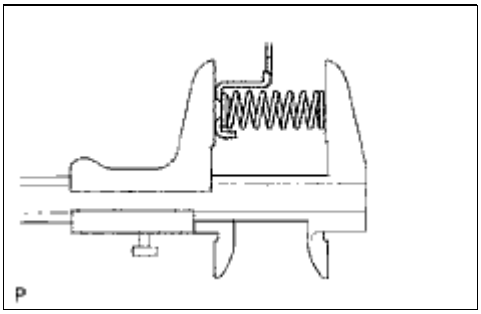


16. INSPECT 1ST AND REVERSE BRAKE RETURN SPRING SUB-ASSEMBLY

(a) Using a vernier caliper, measure the free length of the 1st and reverse brake return spring sub-assembly including the spring seat.

Standard free length:
23.74 mm (0.935 in.)

If the free length is more than the standard free length, replace the 1st and reverse return spring sub-assembly.

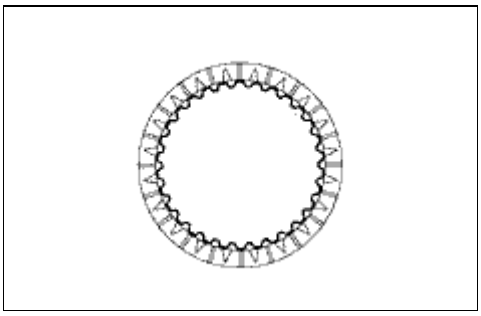


17. INSPECT NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

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(a) Check if the contact surfaces of the No. 1 clutch discs, No. 1 clutch plates and No. 1 clutch flange are worn or burnt.

If necessary, replace them.



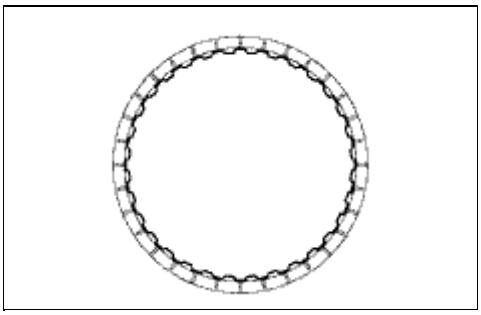
NOTICE:

- If the lining of any No. 1 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 clutch discs.
- Before installing new No. 1 clutch discs, soak them in ATF for at least 15 minutes.

18. INSPECT NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

(a) Check if the contact surfaces of the No. 2 clutch discs, No. 2 clutch plates and No. 2 clutch flange are worn or burnt.

If necessary, replace them.



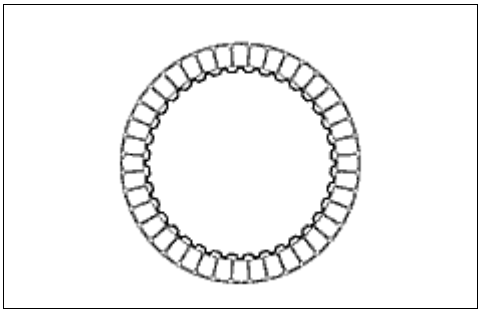
NOTICE:

- If the lining of any No. 2 clutch disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 clutch discs.
- Before installing new No. 2 clutch discs, soak them in ATF for at least 15 minutes.

19. INSPECT NO. 1 BRAKE DISC

(a) Check if the contact surfaces of the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are worn or burnt.

If necessary, replace them.



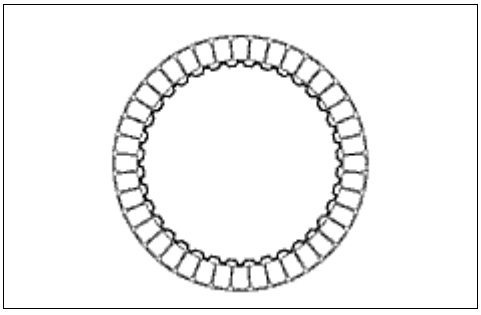
NOTICE:

- If the lining of any No. 1 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 1 brake discs.
- Before installing new No. 1 brake discs, soak them in ATF for at least 15 minutes.

20. INSPECT NO. 2 BRAKE DISC

(a) Check if the contact surfaces of the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

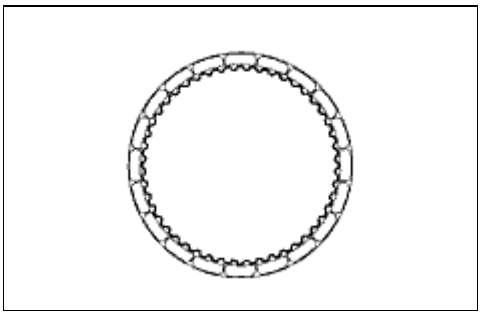
- If the lining of any No. 2 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 2 brake discs.
- Before installing new No. 2 brake discs, soak them in ATF for at least 15 minutes.

21. INSPECT NO. 4 BRAKE DISC

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(a) Check if the contact surfaces of the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are worn or burnt.

If necessary, replace them.



NOTICE:

- If the lining of any No. 4 brake disc is peeled or discolored, or even if part of a groove is damaged, replace all the No. 4 brake discs.
- Before installing new No. 4 brake discs, soak them in ATF for at least 15 minutes.

22. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH)

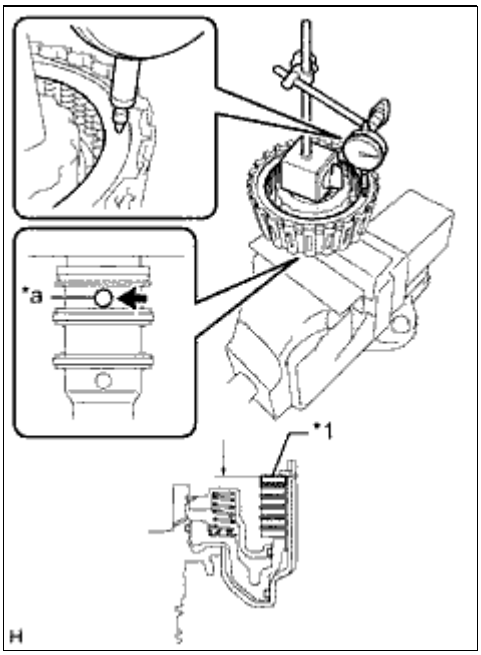
(a) Using a dial indicator, measure the clearance of the No. 1 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Forward Clutch Flange
*a	Oil Hole

Standard clearance:
0.75 to 1.05 mm (0.0296 to 0.0413 in.)

If the clearance is not as specified, select and install an appropriate forward clutch flange that will bring the clearance within the specified range.



HINT:

There are forward clutch flanges of different thicknesses.

Forward Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35635-04010	3.0 (0.118)
35635-04020	3.1 (0.122)
35635-04030	3.2 (0.126)
35635-04040	3.3 (0.130)
35635-04050	3.4 (0.134)
35635-04060	3.5 (0.138)
35635-04070	3.6 (0.142)
35635-04080	3.7 (0.146)
35635-04090	3.8 (0.150)
35635-04100	3.9 (0.154)
35635-04110	4.0 (0.157)

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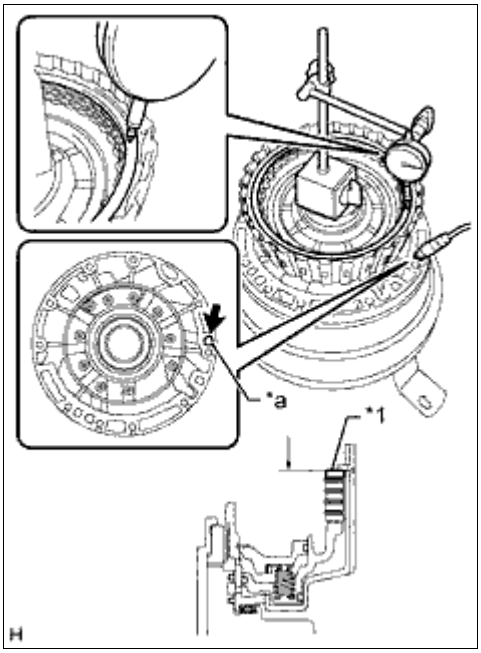
PART NO.	THICKNESS (MM (IN.))
35635-04120	4.1 (0.161)
35635-04130	4.2 (0.165)

23. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH)

(a) Using a dial indicator, measure the clearance of the No. 2 clutch at several points while applying compressed air (196 kPa, 2.0 kgf/cm 2 , 28 psi) to the oil hole as shown in the illustration, and calculate the average.

Text in Illustration

*1	Selected Direct Clutch Flange
*a	Oil Hole



Standard clearance:
0.4 to 0.7 mm (0.0158 to 0.0275 in.)

If the clearance is not as specified, select and install an appropriate direct clutch flange that will bring the clearance within the specified range.

HINT:

There are direct clutch flanges of different thicknesses.

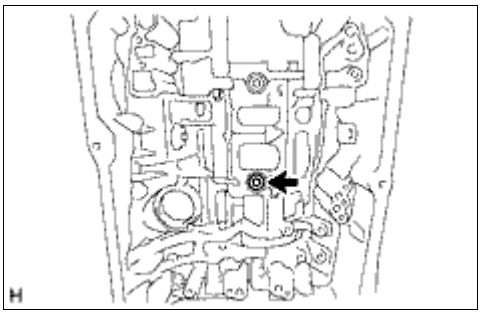
Direct Clutch Flange Thickness:

PART NO.	THICKNESS (MM (IN.))
35675-04010	3.0 (0.118)
35675-04020	3.1 (0.122)
35675-04030	3.2 (0.126)
35675-04040	3.3 (0.130)
35675-04050	3.4 (0.134)
35675-04060	3.5 (0.138)
35675-04070	3.6 (0.142)
35675-04080	3.7 (0.146)
35675-04090	3.8 (0.150)

24. INSPECT CLEARANCE OF NO. 1 BRAKE

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(a) Make sure that the No. 1 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



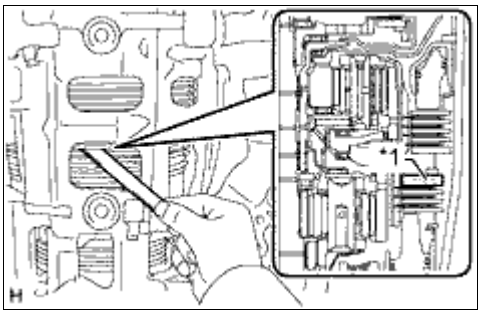
(b) Using a feeler gauge, measure the No. 1 brake pack clearance between the No. 1 brake disc and No. 1 brake flange.

Text in Illustration

*1	Selected No. 1 Brake Flange

Standard clearance:
0.3 to 0.6 mm (0.0119 to 0.0236 in.)

If the clearance is not as specified, select and install an appropriate No. 1 brake flange that will bring the clearance within the specified range.



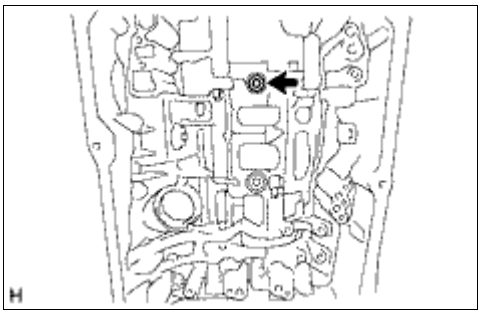
No. 1 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	4.9 (0.193)
1	5.0 (0.197)
2	5.1 (0.201)
3	5.2 (0.205)
4	5.3 (0.209)
5	5.4 (0.213)
6	5.5 (0.217)
7	5.6 (0.220)
8	5.7 (0.224)
A	5.8 (0.228)

25. INSPECT CLEARANCE OF NO. 2 BRAKE

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(a) Make sure that the No. 2 brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



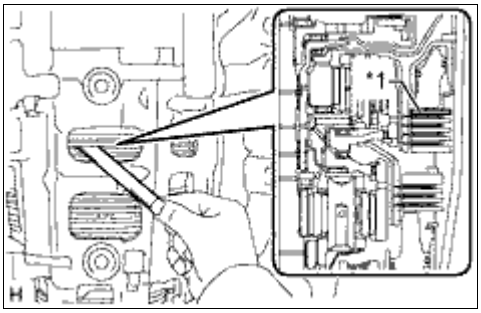
(b) Using a feeler gauge, measure the No. 2 brake pack clearance between the No. 2 brake disc and No. 2 brake flange.

Text in Illustration

*1	Selected No. 2 Brake Flange

Standard clearance:
0.4 to 0.7 mm (0.0158 to 0.0275 in.)

If the clearance is not as specified, select and install an appropriate No. 2 brake flange that will bring the clearance within the specified range.

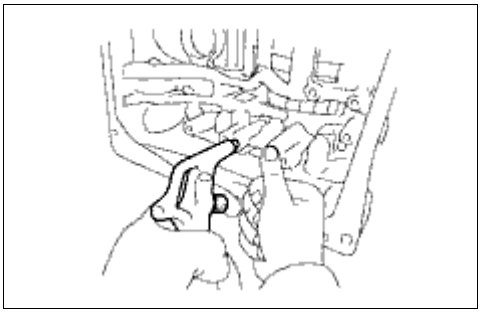


No. 2 Brake Flange Thickness:

MARK	THICKNESS (MM (IN.))
0	2.0 (0.0787)
1	2.1 (0.0827)
2	2.2 (0.0866)
3	2.3 (0.0906)
4	2.4 (0.0945)
5	2.5 (0.0984)
6	2.6 (0.102)
7	2.7 (0.106)
8	2.8 (0.110)

26. INSPECT CLEARANCE OF NO. 4 BRAKE

(a) Make sure that the 1st and reverse brake piston moves smoothly when applying and releasing compressed air (392 kPa, 4.0 kgf/cm 2 , 57 psi).



cardiagn.com

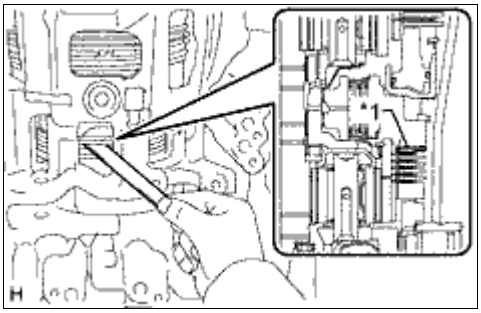
(b) Using a feeler gauge, measure the No. 4 brake pack clearance between the No. 4 brake disc and No. 4 brake flange.

Text in Illustration

*1	Selected No. 4 Brake Flange

Standard clearance:
0.5 to 0.8 mm (0.0197 to 0.0314 in.)

If the clearance is not as specified, select and install an appropriate No. 4 brake flange that will bring the clearance within the specified range.



No. 4 Brake Flange Thickness:

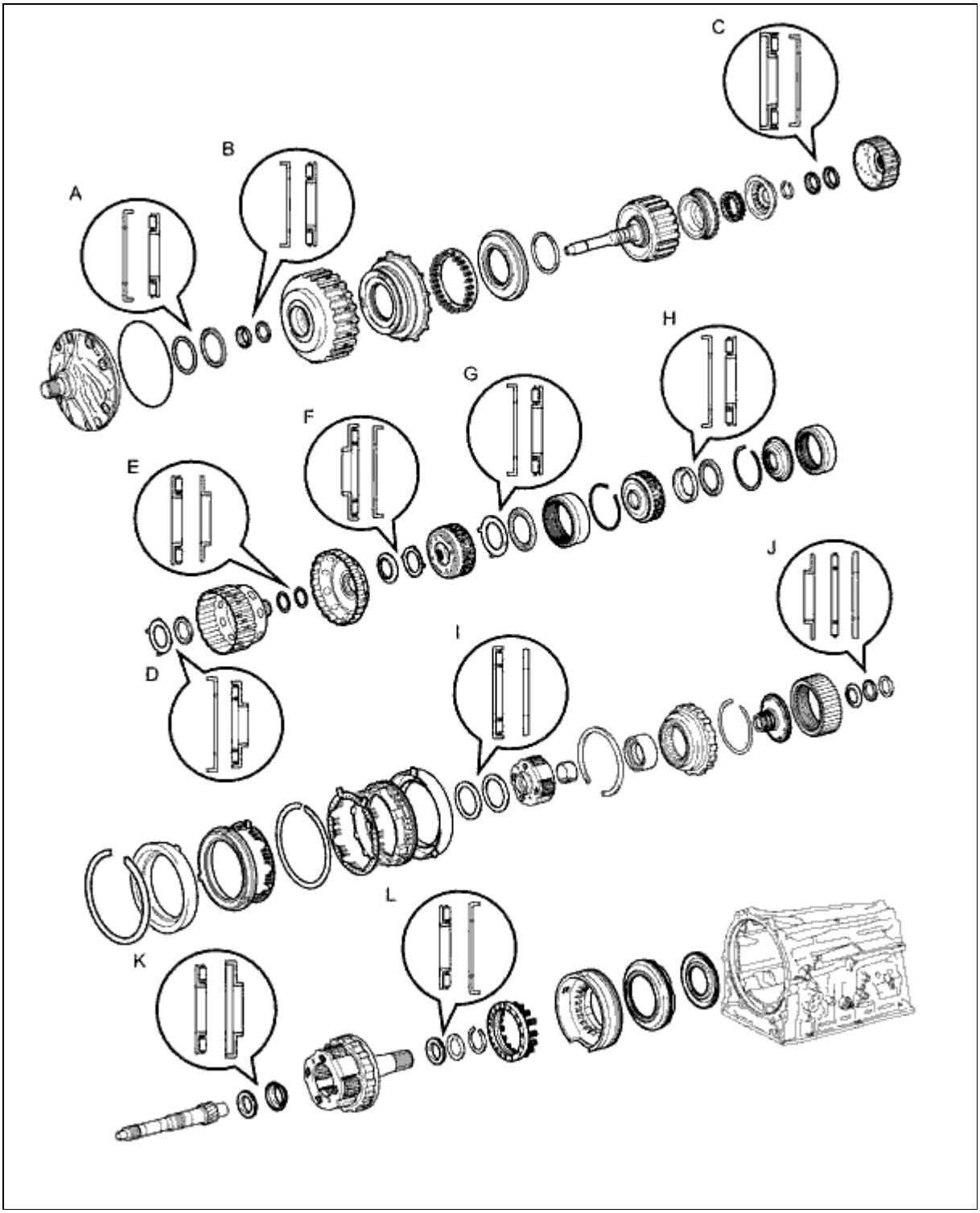
MARK	THICKNESS (MM (IN.))
0	1.8 (0.0709)
2	2.0 (0.0787)
4	2.2 (0.0866)
6	2.4 (0.0945)
8	2.6 (0.102)
10	2.8 (0.110)
12	3.0 (0.118)
14	3.2 (0.126)

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA0052X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: AUTOMATIC TRANSMISSION UNIT (for 2TR-FE): REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. BEARING POSITION

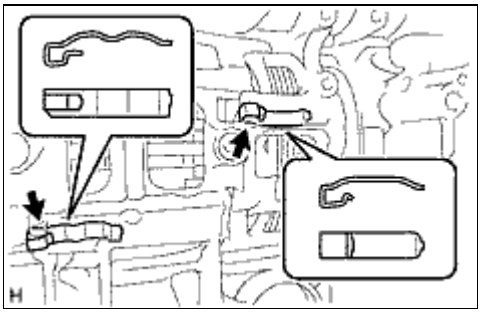


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MARK	FRONT RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))	THRUST BEARING DIAMETER INSIDE / OUTSIDE (MM (IN.))	REAR RACE DIAMETER INSIDE / OUTSIDE (MM (IN.))
A	74.2 (2.921) / 87.74 (3.454)	71.9 (2.831) / 85.6 (3.370)	-
B	40.0 (1.575) / 52.8 (2.079)	34.6 (1.362) / 52.0 (2.047)	-
C	22.0 (0.866) / 44.8 (1.764)	21.3 (0.839) / 41.1 (1.618)	-
D	38.4 (1.512) / 56.5 (2.224)	33.3 (1.311) / 56.6 (2.228)	-
E	-	40.83 (1.607) / 52.8 (2.079)	39.6 (1.559) / 52.8 (2.079)
F	-	37.1 (1.461) / 61.2 (2.409)	44.0 (1.732) / 62.8 (2.472)
G	65.8 (2.591) / 86.3 (3.398)	63.3 (2.492) / 78.8 (3.102)	-
H	66.3 (2.610) / 78.9 (3.106)	63.3 (2.492) / 78.8 (3.102)	-
I	-	55.7 (2.193) / 76.4 (3.008)	53.7 (2.114) / 74.0 (2.913)
J	33.4 (1.315) / 49.0 (1.929)	32.1 (1.264) / 49.35 (1.943)	32.1 (1.264) / 49.0 (1.929)
K	-	21.0 (0.827) / 41.5 (1.634)	23.13 (0.911) / 41.5 (1.634)
L	-	43.55 (1.715) / 61.0 (2.402)	47.1 (1.854) / 67.1 (2.642)

2. INSTALL BRAKE PLATE STOPPER SPRING

(a) Install the 2 brake plate stopper springs to the automatic transmission case sub-assembly.



NOTICE:

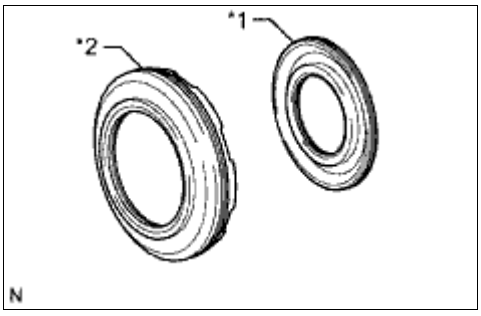
The shapes of the parts are different. Refer to the illustration when installing the parts.

3. INSTALL NO. 4 BRAKE PISTON

(a) Coat 2 new O-rings with ATF, and install them to the brake reaction sleeve.

(b) Coat 2 new O-rings with ATF, and install them to the No. 4 brake piston.

(c) Install the No. 4 brake piston to the brake reaction sleeve.



Text in Illustration

*1	No. 4 Brake Piston
*2	Brake Reaction Sleeve

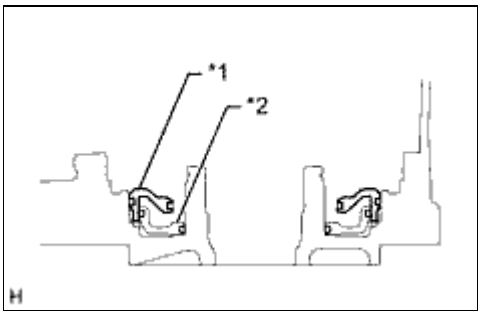
NOTICE:

Be careful not to damage the O-rings.

4. INSTALL BRAKE REACTION SLEEVE

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(a) With the No. 4 brake piston underneath (the rear side), install the brake reaction sleeve and No. 4 brake piston to the automatic transmission case sub-assembly.



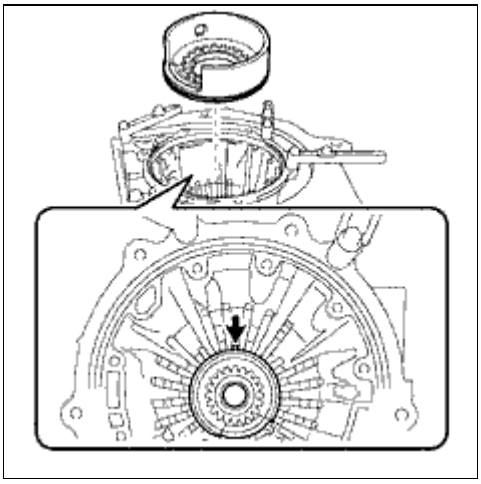
Text in Illustration

*1	Brake Reaction Sleeve
*2	No. 4 Brake Piston

NOTICE:

Be careful not to damage the O-rings.

5. INSTALL 1ST AND REVERSE BRAKE PISTON

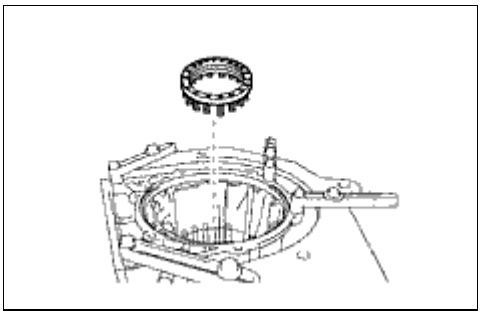


(a) Coat a new O-ring with ATF, and install it to the 1st and reverse brake piston.

(b) Install the 1st and reverse brake piston to the automatic transmission case sub-assembly while making sure that the protrusion of the 1st and reverse brake piston is positioned as shown in the illustration.

NOTICE:

Be careful not to damage the O-ring.

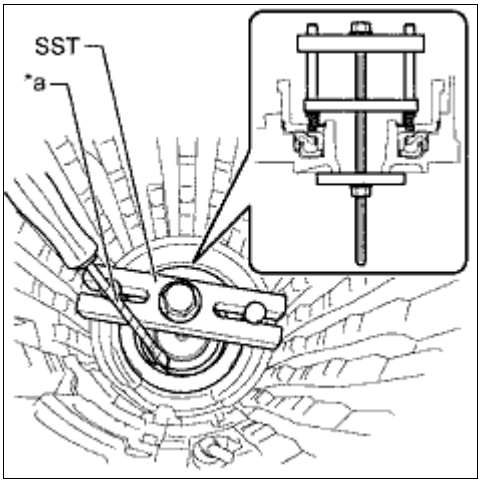


(c) Install the 1st and reverse brake return spring sub-assembly to the automatic transmission case sub-assembly.

(d) Place the 1st and reverse brake return spring sub-assembly onto the 1st and reverse brake piston.

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(e) Place SST on the 1st and reverse brake return spring sub-assembly, and compress the 1st and reverse brake return spring sub-assembly.



Text in Illustration

*a	Protective Tape

SST: 09380-60011

09381-05040
09381-05050
09381-06030
09381-06040
09381-06120
09381-06130
09381-06140

(f) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the 1st and reverse brake return spring sub-assembly and automatic transmission case sub-assembly.

HINT:

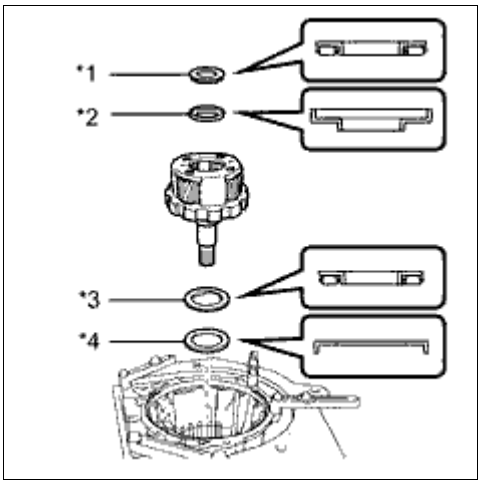
Tape the screwdriver tip before use.

6. INSTALL REAR PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the automatic transmission case sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing K
*2	Thrust Bearing Race K
*3	Thrust Needle Roller Bearing L
*4	Thrust Bearing Race L



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing K	21.0 (0.827)	41.5 (1.634)
Thrust Bearing Race K	23.13 (0.911)	41.5 (1.634)
Thrust Needle Roller Bearing L	43.55 (1.715)	61.0 (2.402)
Thrust Bearing Race L	47.1 (1.854)	67.1 (2.642)

NOTICE:

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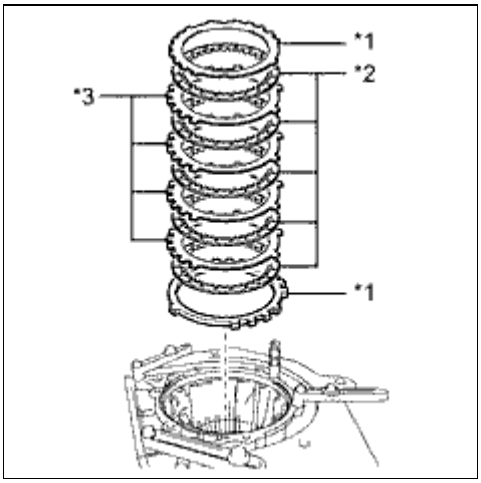
Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Coat the 2 thrust needle roller bearings and thrust bearing race with ATF and install them to the rear planetary gear assembly.

(c) Install the rear planetary gear assembly to the automatic transmission case sub-assembly.

7. INSTALL NO. 4 BRAKE DISC

(a) Install the 2 No. 4 brake flanges, 5 No. 4 brake discs and 4 No. 4 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

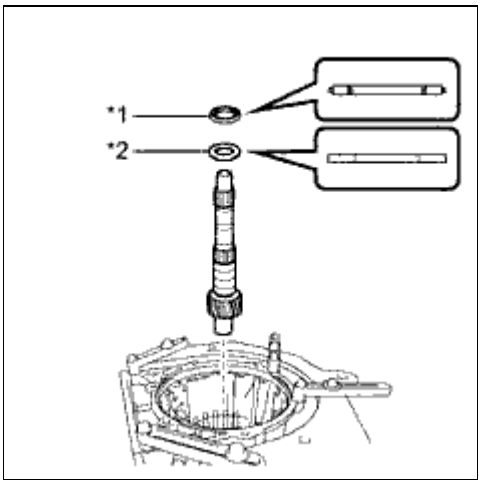
*1	No. 4 Brake Flange
*2	No. 4 Brake Disc
*3	No. 4 Brake Plate

NOTICE:

- Make sure that the No. 4 brake discs, No. 4 brake plates and No. 4 brake flanges are installed in the correct order.
- Install the thicker No. 4 brake flange first, and then install the thinner one.

8. INSTALL INTERMEDIATE SHAFT

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the intermediate shaft.



Text in Illustration

*1	Thrust Needle Roller Bearing J
*2	Thrust Bearing Race J (Rear Race)

Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

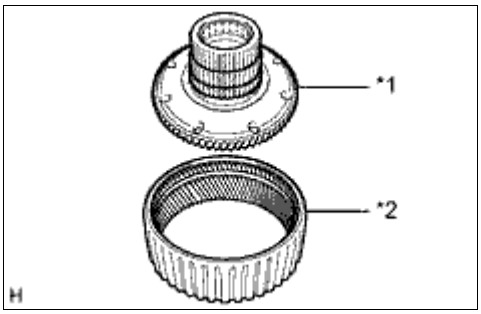
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing J	32.1 (1.264)	49.35 (1.943)
Thrust Bearing Race J (Rear Race)	32.1 (1.264)	49.0 (1.929)

(b) Install the intermediate shaft to the automatic transmission case sub-assembly.

9. INSTALL REAR PLANETARY RING GEAR

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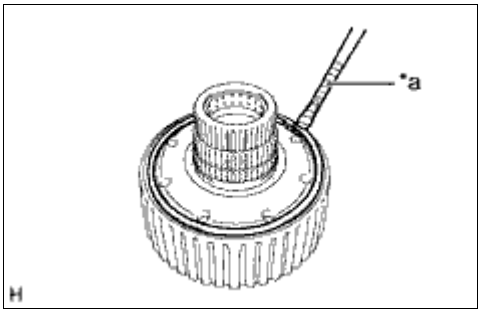
(a) Install the rear planetary ring gear to the rear planetary ring gear flange sub-assembly.



Text in Illustration

*1	Rear Planetary Ring Gear Flange Sub-assembly
*2	Rear Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

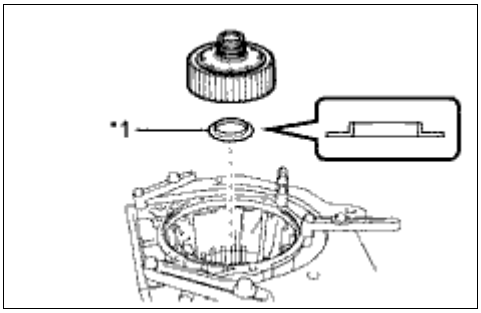
Be careful not to damage the rear planetary ring gear flange sub-assembly with rear planetary ring gear.

HINT:

Tape the screwdriver tip before use.

10. INSTALL REAR PLANETARY RING GEAR FLANGE SUB-ASSEMBLY WITH REAR PLANETARY RING GEAR

(a) Coat the thrust bearing race with ATF and install it to the rear planetary ring gear flange sub-assembly with rear planetary ring gear.



Text in Illustration

*1	Thrust Bearing Race J (Front Race)

Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race J (Front Race)	33.4 (1.315.)	49.0 (1.929)

NOTICE:

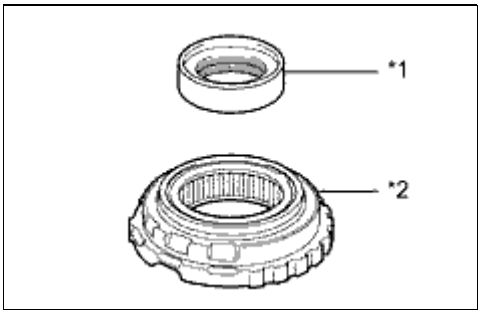
Be sure to install the thrust bearing race in the correct direction.

(b) Install the rear planetary ring gear flange sub-assembly with rear planetary ring gear to the automatic transmission case sub-assembly.

11. INSTALL ONE-WAY CLUTCH INNER RACE

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(a) Install the one-way clutch inner race to the No. 3 one-way clutch assembly.



Text in Illustration

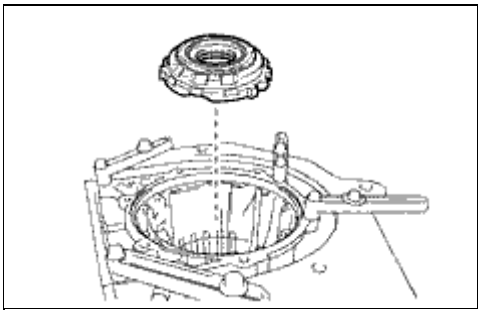
*1	One-way Clutch Inner Race
*2	No. 3 One-way Clutch Assembly

HINT:

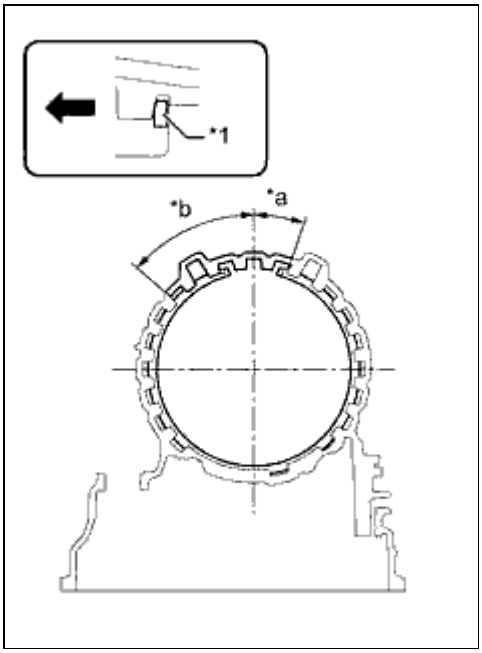
Rotate the one-way clutch inner race clockwise to install it.

12. INSTALL NO. 3 ONE-WAY CLUTCH ASSEMBLY WITH ONE-WAY CLUTCH INNER RACE

(a) Install the No. 3 one-way clutch assembly with one-way clutch inner race to the automatic transmission case sub-assembly.



(b) Using SST, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*1	Snap Ring
*a	19°
*b	49°
➡	Front Side

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SST: 09350-30020

09350-07060

NOTICE:

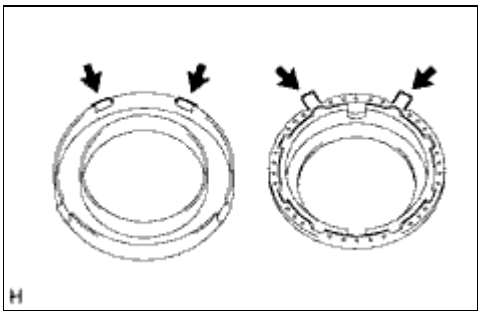
- Install the snap ring so that the tapered side is facing out.
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.

13. INSPECT CLEARANCE OF NO. 4 BRAKE INFO

14. INSTALL NO. 1 BRAKE PISTON

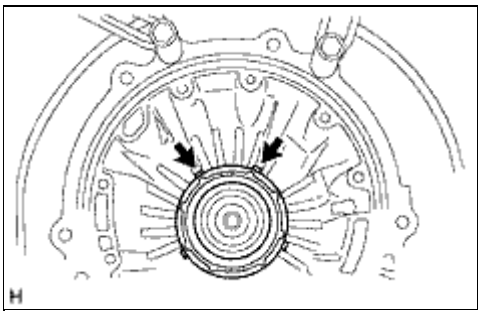
(a) Coat 2 new O-rings with ATF and install them to the No. 1 brake piston.

(b) With the No. 1 brake piston return spring sub-assembly installed to the No. 1 brake piston, align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston to the No. 1 brake cylinder.



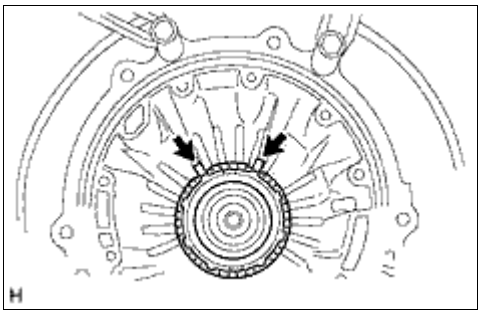
15. INSTALL NO. 1 BRAKE CYLINDER WITH NO. 1 BRAKE PISTON

(a) Install the No. 1 brake cylinder with No. 1 brake piston to the automatic transmission case sub-assembly while making sure that the 2 claws of the No. 1 brake cylinder with No. 1 brake piston are positioned as shown in the illustration.



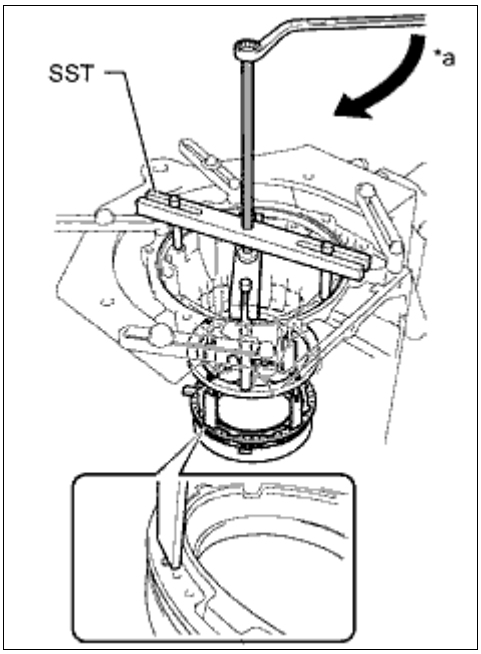
16. INSTALL NO. 1 BRAKE PISTON RETURN SPRING SUB-ASSEMBLY

(a) Align the 2 claws of the No. 1 brake piston return spring sub-assembly with the 2 claws of the No. 1 brake cylinder, and then install the No. 1 brake piston return spring sub-assembly to the No. 1 brake piston.



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(b) Place SST on the No. 1 brake piston return spring sub-assembly, and compress the No. 1 brake piston return spring sub-assembly with a press.



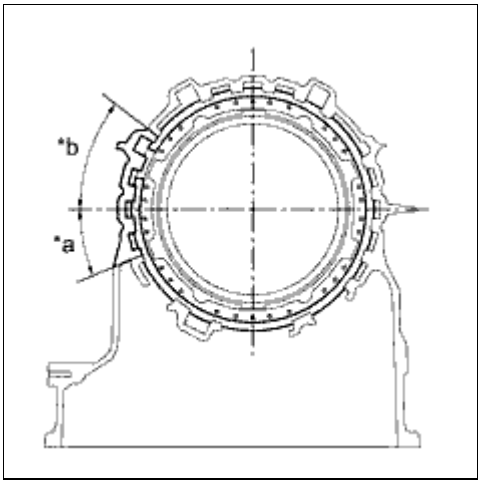
Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06040
09381-06050
09381-06070
09381-06090
09381-06100
09381-06110
09381-06120

(c) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

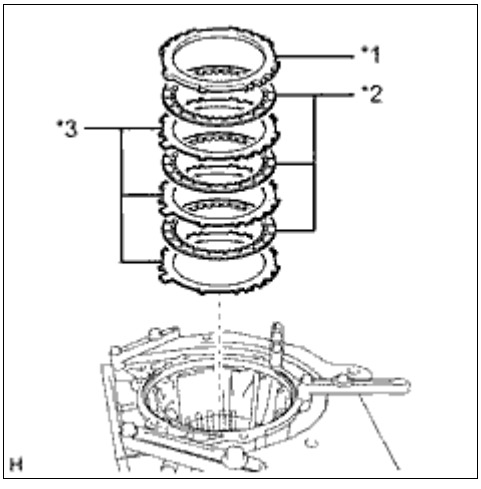
- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

Tape the screwdriver tip before use.

17. INSTALL NO. 1 BRAKE DISC

(a) Install the No. 1 brake flange, 3 No. 1 brake discs and 3 No. 1 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

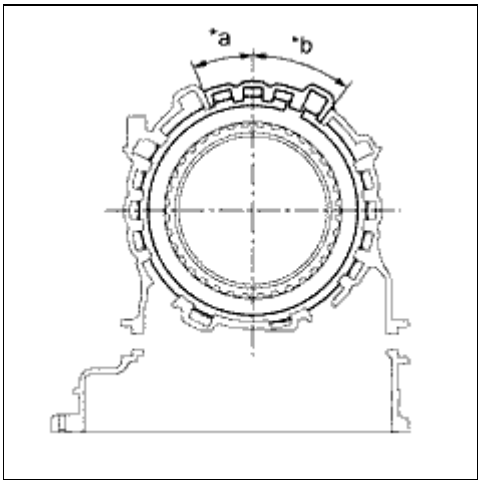
*1	No. 1 Brake Flange
*2	No. 1 Brake Disc
*3	No. 1 Brake Plate

NOTICE:

Make sure that the No. 1 brake discs, No. 1 brake plates and No. 1 brake flange are installed in the correct order.

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(b) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	22.5°
*b	37.5°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

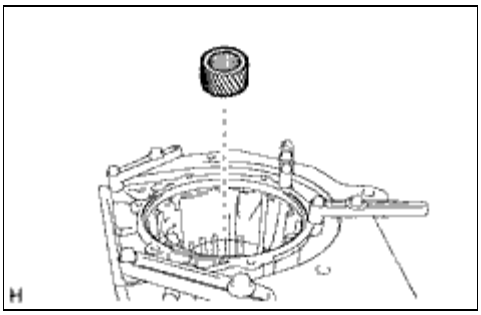
HINT:

Tape the screwdriver tip before use.

18. INSPECT CLEARANCE OF NO. 1 BRAKE INFO

19. INSTALL PLANETARY SUN GEAR

(a) Install the planetary sun gear to the automatic transmission case sub-assembly.

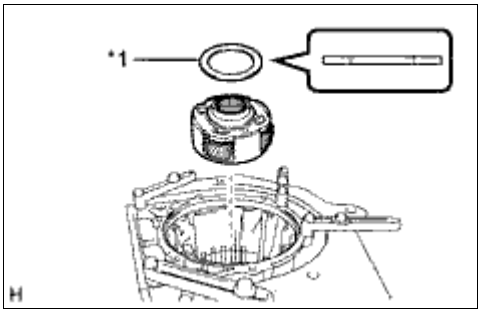


20. INSTALL CENTER PLANETARY GEAR ASSEMBLY

(a) Coat the thrust bearing race with ATF and install it to the center planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race I



Thrust Bearing Race Diameter:

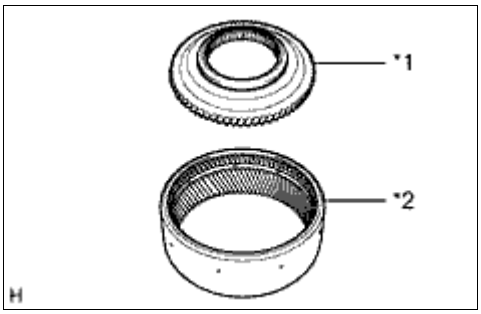
ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race I	53.7 (2.114)	74.0 (2.913)

(b) Install the center planetary gear assembly to the automatic transmission case sub-assembly.

21. INSTALL CENTER PLANETARY RING GEAR

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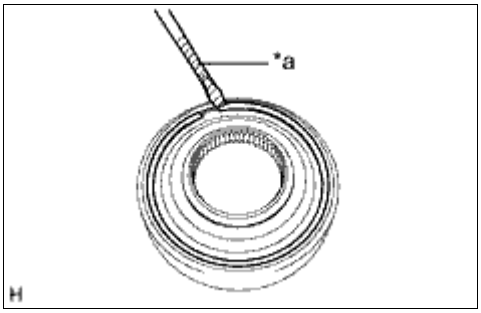
(a) Install the center planetary ring gear to the center planetary ring gear flange.



Text in Illustration

*1	Center Planetary Ring Gear Flange
*2	Center Planetary Ring Gear

(b) Using a screwdriver, install the snap ring to the center planetary ring gear flange with center planetary ring gear.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the center planetary ring gear flange with center planetary ring gear.

HINT:

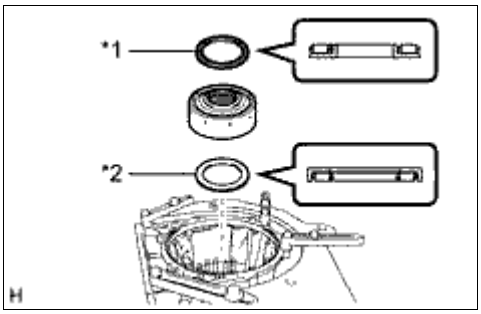
Tape the screwdriver tip before use.

22. INSTALL CENTER PLANETARY RING GEAR FLANGE WITH CENTER PLANETARY RING GEAR

(a) Coat the 2 thrust needle roller bearings with ATF and install them to the center planetary ring gear flange with center planetary ring gear.

Text in Illustration

*1	Thrust Needle Roller Bearing H
*2	Thrust Needle Roller Bearing I



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing H	63.3 (2.492)	78.8 (3.102)
Thrust Needle Roller Bearing I	55.7 (2.193)	76.4 (3.008)

NOTICE:

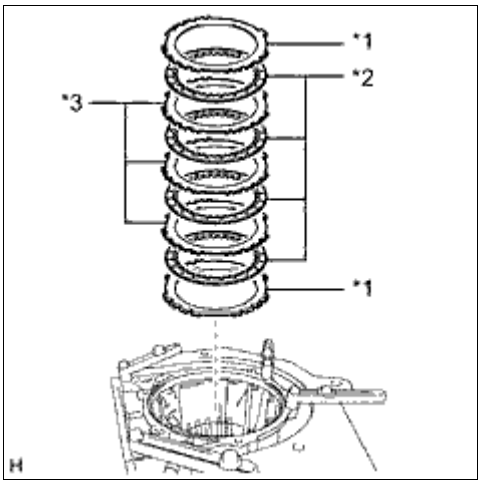
Be sure to install the thrust needle roller bearing in the correct direction.

(b) Install the center planetary ring gear flange with center planetary ring gear to the automatic transmission case sub-assembly.

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23. INSTALL NO. 2 BRAKE DISC

(a) Install the 2 No. 2 brake flanges, 4 No. 2 brake discs and 3 No. 2 brake plates to the automatic transmission case sub-assembly.



Text in Illustration

*1	No. 2 Brake Flange
*2	No. 2 Brake Disc
*3	No. 2 Brake Plate

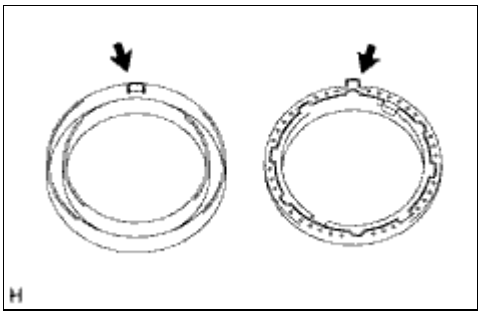
NOTICE:

- Make sure that the No. 2 brake discs, No. 2 brake plates and No. 2 brake flanges are installed in the correct order.
- Install the thicker No. 2 brake flange first, and then install the thinner one.

24. INSTALL NO. 2 BRAKE PISTON

(a) Coat 2 new O-rings with ATF and install them to the No. 2 brake piston.

(b) With the No. 2 brake piston return spring sub-assembly installed to the No. 2 brake piston, align the claw of the No. 2 brake piston return spring sub-assembly with the claw of the No. 2 brake cylinder, and then install the No. 2 brake piston to the No. 2 brake cylinder.

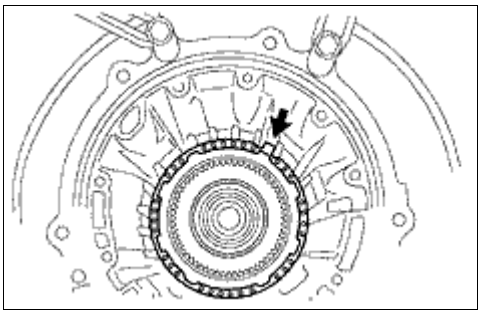


NOTICE:

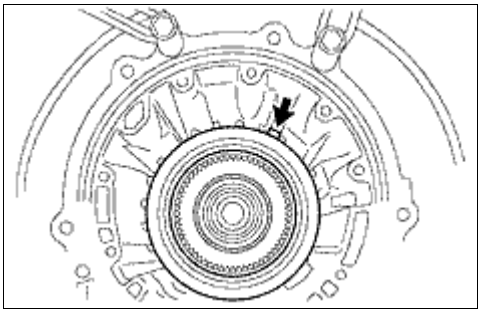
Be careful not to damage the O-rings.

25. INSTALL NO. 2 BRAKE CYLINDER WITH NO. 2 BRAKE PISTON

(a) Install the No. 2 brake piston return spring sub-assembly to the automatic transmission case sub-assembly while making sure that the claw of the No. 2 brake piston return spring sub-assembly is positioned as shown in the illustration.

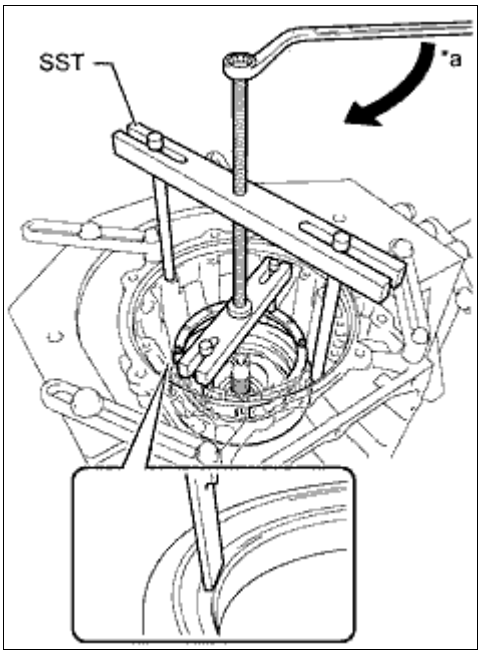


(b) Install the No. 2 brake cylinder with No. 2 brake piston to the automatic transmission case sub-assembly while making sure that the claw of the No. 1 brake cylinder with No. 1 brake piston is positioned as shown in the illustration.



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(c) Place SST on the No. 2 brake cylinder, and compress the No. 2 brake piston return spring sub-assembly with a press.



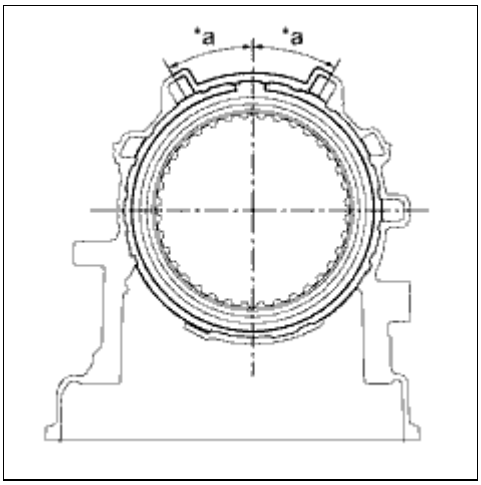
Text in Illustration

*a	Turn

SST: 09380-60011

09381-06010
09381-06020
09381-06040
09381-06050
09381-06060
09381-06090
09381-06100
09381-06110
09381-06120

(d) Using a screwdriver, install the snap ring to the automatic transmission case sub-assembly.



Text in Illustration

*a	30°

NOTICE:

- Be sure to install the snap ring so that the ends of the snap ring are within the area shown in the illustration.
- Be careful not to damage the automatic transmission case sub-assembly.

HINT:

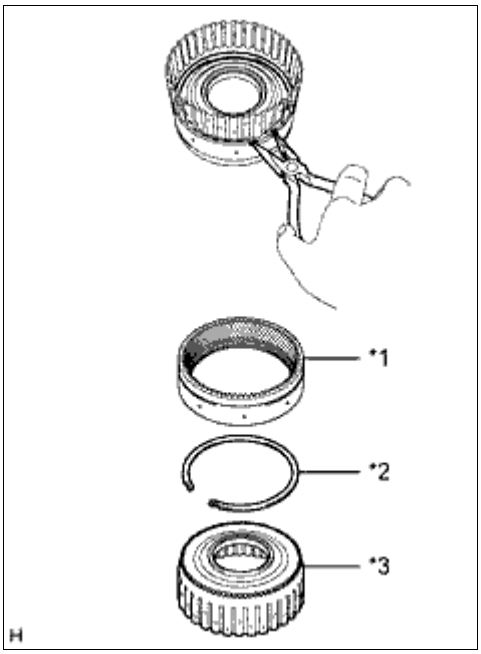
Tape the screwdriver tip before use.

26. INSPECT CLEARANCE OF NO. 2 BRAKE INFO

27. INSTALL FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

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(a) Set the snap ring onto the front planetary ring gear flange sub-assembly. Using needle-nose pliers, insert the snap ring into the front planetary ring gear while squeezing it, and then expand the snap ring to install it.



Text in Illustration

*1	Front Planetary Ring Gear
*2	Snap Ring
*3	Front Planetary Ring Gear Flange Sub-assembly

NOTICE:

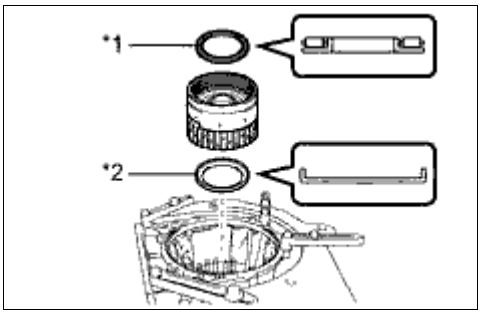
Make sure the snap ring is securely inserted into the groove of the front planetary ring gear.

28. INSTALL FRONT PLANETARY RING GEAR WITH FRONT PLANETARY RING GEAR FLANGE SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the front planetary ring gear with front planetary ring gear flange sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing G
*2	Thrust Bearing Race H



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing G	63.3 (2.492)	78.8 (3.102)
Thrust Bearing Race H	66.3 (2.610)	78.9 (3.106)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the front planetary ring gear with front planetary ring gear flange sub-assembly to the automatic transmission case sub-assembly.

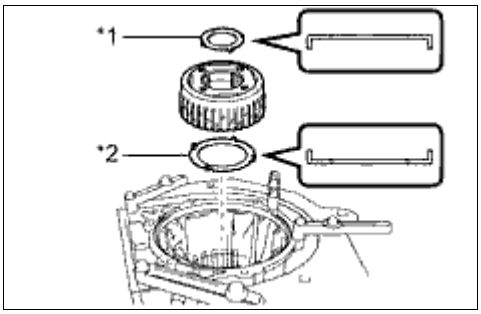
29. INSTALL FRONT PLANETARY GEAR ASSEMBLY

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(a) Coat the 2 thrust bearing races with ATF and install them to the front planetary gear assembly.

Text in Illustration

*1	Thrust Bearing Race F
*2	Thrust Bearing Race G



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race F	44.0 (1.732)	62.8 (2.472)
Thrust Bearing Race G	65.8 (2.591)	86.3 (3.398)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

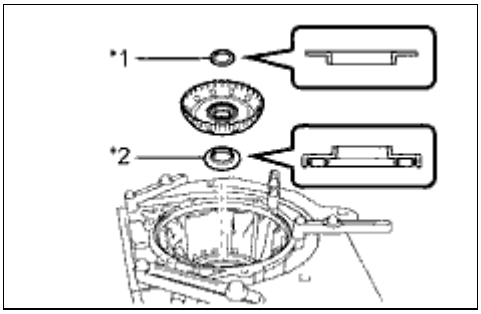
(b) Install the front planetary gear assembly to the automatic transmission case sub-assembly.

30. INSTALL SUN GEAR INPUT DRUM SUB-ASSEMBLY

(a) Coat the thrust needle roller bearing and thrust bearing race with ATF and install them to the sun gear input drum sub-assembly.

Text in Illustration

*1	Thrust Bearing Race E
*2	Thrust Needle Roller Bearing F



Thrust Needle Roller Bearing and Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race E	40.83 (1.607)	52.8 (2.079)
Thrust Needle Roller Bearing F	37.1 (1.461)	61.2 (2.409)

NOTICE:

Be sure to install the thrust needle roller bearing and thrust bearing race in the correct direction.

(b) Install the sun gear input drum sub-assembly to the automatic transmission case sub-assembly.

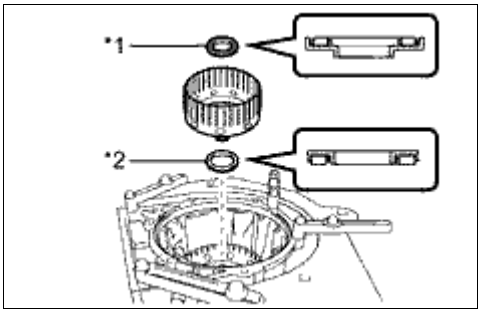
31. INSTALL FORWARD CLUTCH HUB SUB-ASSEMBLY

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(a) Coat the 2 thrust needle roller bearings with ATF and install them to the forward clutch hub sub-assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing D
*2	Thrust Needle Roller Bearing E



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing D	33.3 (1.311)	56.6 (2.228)
Thrust Needle Roller Bearing E	39.6 (1.559)	52.8 (2.079)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

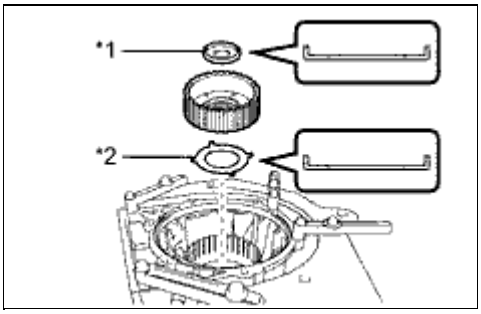
(b) Install the forward clutch hub sub-assembly to the automatic transmission case sub-assembly.

32. INSTALL MULTIPLE DISC CLUTCH HUB

(a) Coat the 2 thrust bearing races with ATF and install them to the multiple disc clutch hub.

Text in Illustration

*1	Thrust Bearing Race C
*2	Thrust Bearing Race D



Thrust Bearing Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race C	22.0 (0.866)	44.8 (1.764)
Thrust Bearing Race D	38.4 (1.512)	56.5 (2.224)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

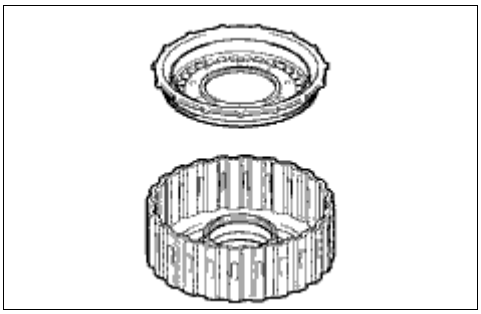
(b) Install the multiple disc clutch hub to the automatic transmission case sub-assembly.

33. INSTALL DIRECT CLUTCH PISTON

(a) Coat 2 new O-rings with ATF, and install them to the direct clutch piston.

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(b) Install the direct clutch piston to the direct clutch drum sub-assembly.

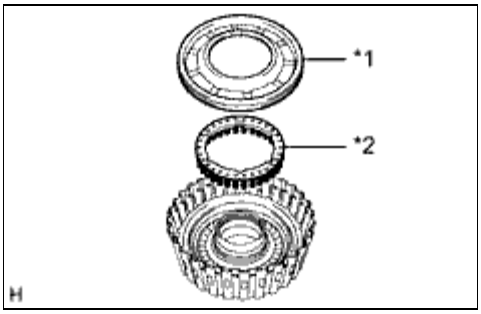


NOTICE:

Be careful not to damage the O-rings.

34. INSTALL NO. 2 CLUTCH BALANCER

(a) Install the direct clutch return spring sub-assembly to the direct clutch piston.



Text in Illustration

*1	No. 2 Clutch Balancer
*2	Direct Clutch Return Spring Sub-assembly

(b) Coat a new O-ring with ATF, and install it to the No. 2 clutch balancer.

(c) Install the No. 2 clutch balancer to the direct clutch drum sub-assembly.

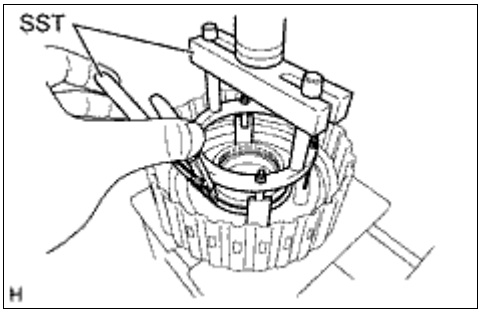
NOTICE:

Be careful not to damage the O-ring.

(d) Place SST on the No. 2 clutch balancer, and compress the direct clutch return spring sub-assembly with a press.

SST: 09380-60011

09381-06030
09381-06040
09381-06080
09381-06100
09381-06110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(e) Using SST, install the snap ring.

SST: 09350-30020

09350-07070

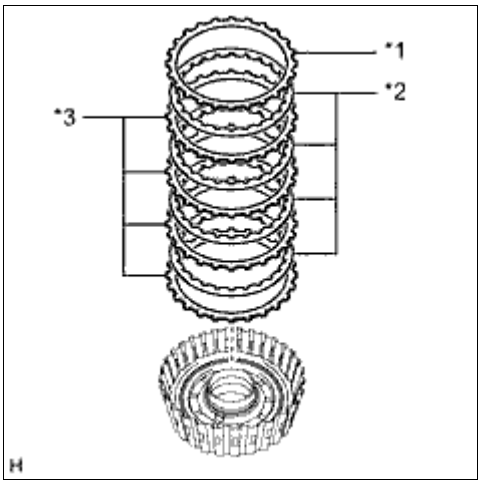
NOTICE:

Do not expand the snap ring excessively.

35. INSTALL NO. 2 CLUTCH DISC (DIRECT CLUTCH DISC)

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(a) Install the 4 No. 2 clutch plates, 4 No. 2 clutch discs and direct clutch flange to the direct clutch drum sub-assembly.



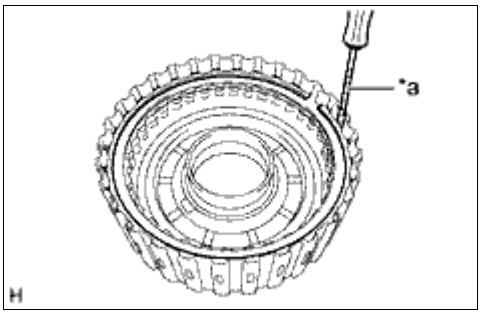
Text in Illustration

*1	Direct Clutch Flange
*2	No. 2 Clutch Disc
*3	No. 2 Clutch Plate

NOTICE:

Make sure that the No. 2 clutch discs, No. 2 clutch plates and direct clutch flange are installed in the correct order.

(b) Using a screwdriver, install the snap ring to the direct clutch drum sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Be careful not to damage the direct clutch drum sub-assembly.

HINT:

Tape the screwdriver tip before use.

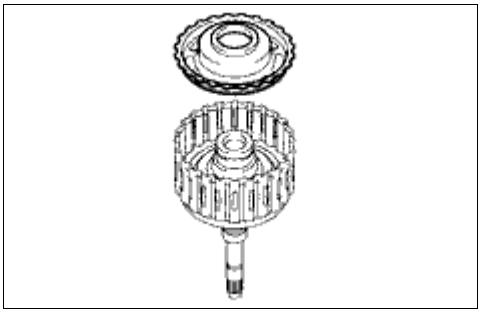
36. INSPECT CLEARANCE OF NO. 2 CLUTCH (DIRECT CLUTCH) INFO

37. INSTALL FORWARD CLUTCH PISTON

(a) Coat a new O-ring with ATF, and install it to the input shaft sub-assembly.

(b) Coat a new O-ring with ATF, and install it to the forward clutch piston.

(c) Install the forward clutch piston to the input shaft sub-assembly.



NOTICE:

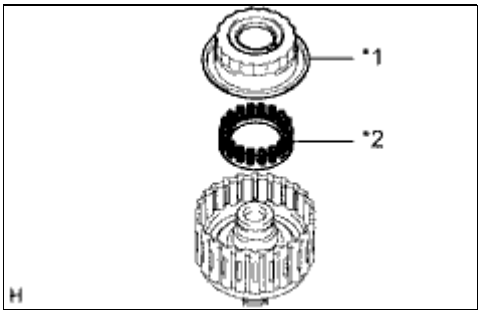
Be careful not to damage the O-rings.

38. INSTALL NO. 1 CLUTCH BALANCER

(a) Coat a new O-ring with ATF, and install it to the No. 1 clutch balancer.

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(b) Install the forward clutch return spring sub-assembly and No. 1 clutch balancer to the input shaft sub-assembly.



Text in Illustration

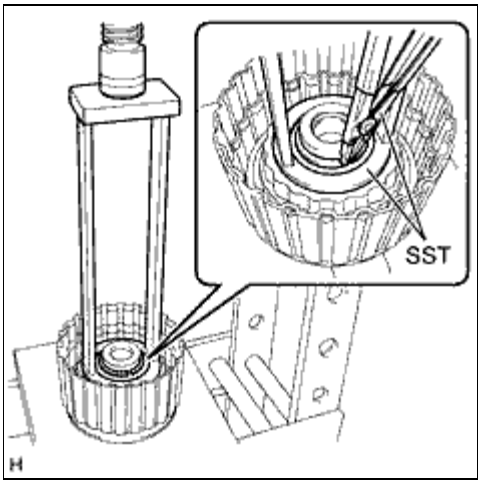
*1	No. 1 Clutch Balancer
*2	Forward Clutch Return Spring Sub-assembly

NOTICE:

Be careful not to damage the O-ring.

(c) Place SST on the No. 1 clutch balancer, and compress the forward clutch return spring sub-assembly with a press.

SST: 09387-00110



NOTICE:

Stop pressing when the spring sheet is lowered to the place 1 to 2 mm (0.0394 to 0.0787 in.) from the snap ring groove to prevent the spring sheet from being deformed.

(d) Using SST, install the snap ring.

SST: 09350-30020

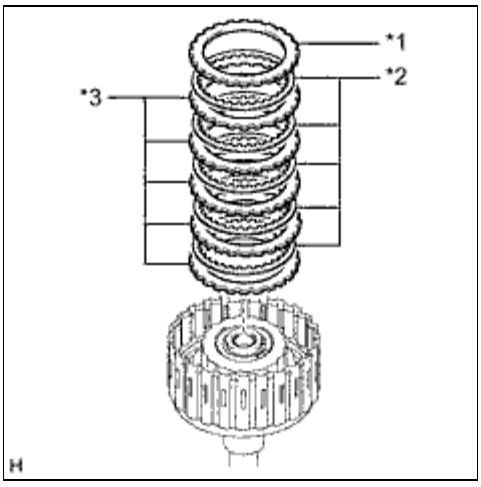
09350-07070

NOTICE:

Do not expand the snap ring excessively.

39. INSTALL NO. 1 CLUTCH DISC (FORWARD CLUTCH DISC)

(a) Install the 5 No. 1 clutch plates, 5 No. 1 clutch discs and forward clutch flange to the input shaft sub-assembly.



Text in Illustration

*1	Forward Clutch Flange
*2	No. 1 Clutch Disc
*3	No. 1 Clutch Plate

NOTICE:

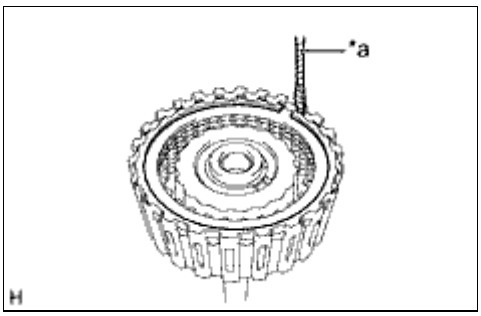
Make sure that the No. 1 clutch discs, No. 1 clutch plates and forward clutch flange are installed in the correct order.

cardiagn.com

(b) Using a screwdriver, install the snap ring.

Text in Illustration

*a	Protective Tape



NOTICE:

Be careful not to damage the input shaft sub-assembly.

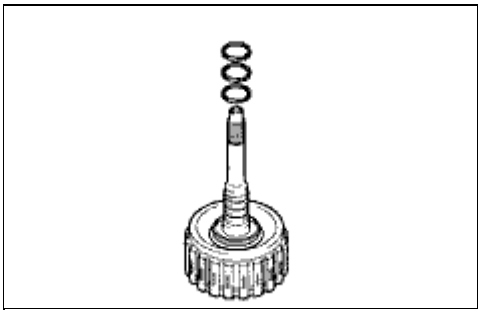
HINT:

Tape the screwdriver tip before use.

40. INSPECT CLEARANCE OF NO. 1 CLUTCH (FORWARD CLUTCH DISC) INFO

41. INSTALL CLUTCH DRUM OIL SEAL RING

(a) Coat 3 new clutch drum oil seal rings with ATF and install them to the input shaft sub-assembly.



NOTICE:

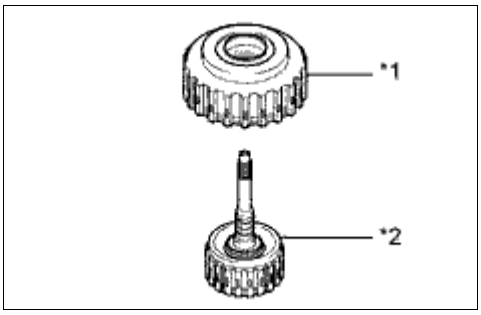
Do not expand the clutch drum oil seal ring ends excessively.

HINT:

After installing the clutch drum oil seal rings, check that they rotate smoothly.

42. INSTALL DIRECT CLUTCH DRUM SUB-ASSEMBLY

(a) Install the direct clutch drum sub-assembly to the input shaft sub-assembly.



Text in Illustration

*1	Direct Clutch Drum Sub-assembly
*2	Input Shaft Sub-assembly

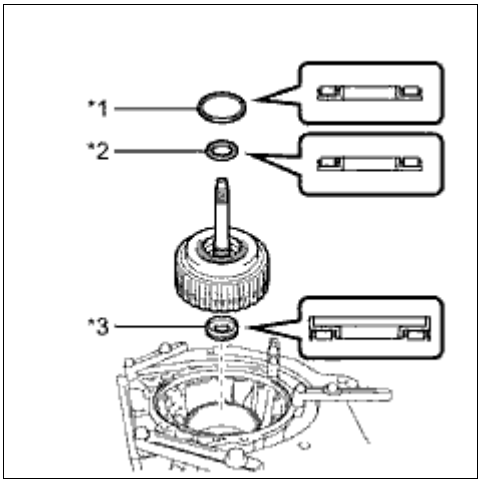
43. INSTALL CLUTCH DRUM AND INPUT SHAFT ASSEMBLY

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(a) Coat the 3 thrust needle roller bearings with ATF and install them to the clutch drum and input shaft assembly.

Text in Illustration

*1	Thrust Needle Roller Bearing A
*2	Thrust Needle Roller Bearing B
*3	Thrust Needle Roller Bearing C



Thrust Needle Roller Bearing Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Needle Roller Bearing A	71.9 (2.831)	85.6 (3.370)
Thrust Needle Roller Bearing B	34.6 (1.362)	52.0 (2.047)
Thrust Needle Roller Bearing C	21.3 (0.839)	41.1 (1.618)

NOTICE:

Be sure to install the thrust needle roller bearing in the correct direction.

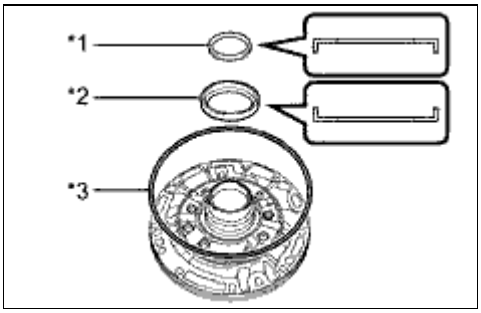
(b) Install the clutch drum and input shaft assembly to the automatic transmission case sub-assembly.

44. INSTALL OIL PUMP ASSEMBLY

(a) Coat the 2 thrust bearing races with ATF and install them to the oil pump assembly.

Text in Illustration

*1	Thrust Bearing Race B
*2	Thrust Bearing Race A
*3	Oil Pump O-ring



Race Diameter:

ITEM	INSIDE (MM (IN.))	OUTSIDE (MM (IN.))
Thrust Bearing Race B	40.0 (1.575)	52.8 (2.079)
Thrust Bearing Race A	74.2 (2.921)	87.74 (3.454)

NOTICE:

Be sure to install the thrust bearing race in the correct direction.

(b) Coat a new oil pump O-ring with ATF, and install it to the oil pump assembly.

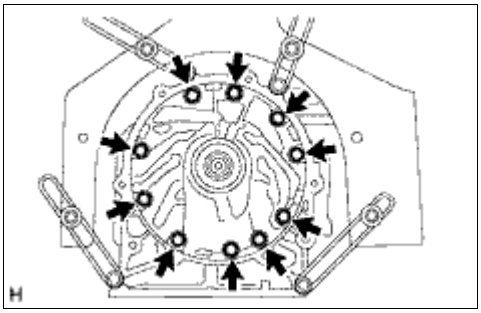
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(c) Set the oil pump assembly on the input shaft, and align the bolt holes of the oil pump assembly with the automatic transmission case sub-assembly.

NOTICE:

Be careful not to damage the oil pump O-ring.

(d) Temporarily install the oil pump assembly to the automatic transmission case sub-assembly.

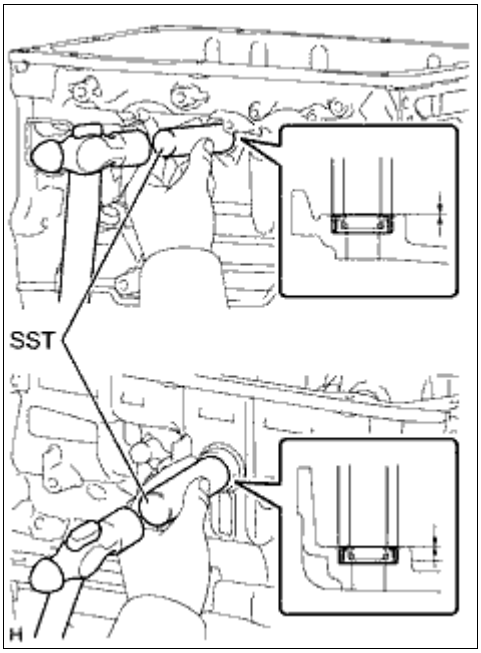


(e) Install the oil pump assembly with the 10 bolts.

Torque:

21 N·m {215 kgf·cm, 16ft·lbf}

45. INSTALL MANUAL VALVE LEVER SHAFT OIL SEAL



(a) Using SST and a hammer, drive in 2 new manual valve lever shaft oil seals to the automatic transmission case sub-assembly.

SST: 09350-30020

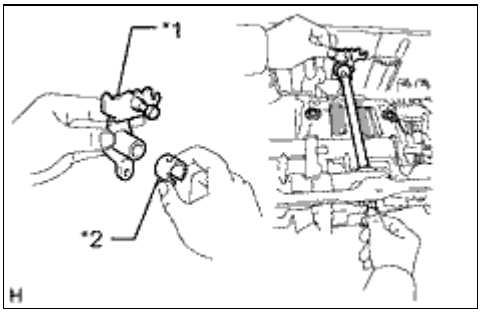
09350-07110

Standard depth:

-0.5 to 0.5 mm (-0.0196 to 0.0196 in.)

(b) Coat the lip of the manual valve lever shaft oil seal with MP grease.

46. INSTALL MANUAL VALVE LEVER SUB-ASSEMBLY



(a) Install a new spacer to the manual valve lever sub-assembly.

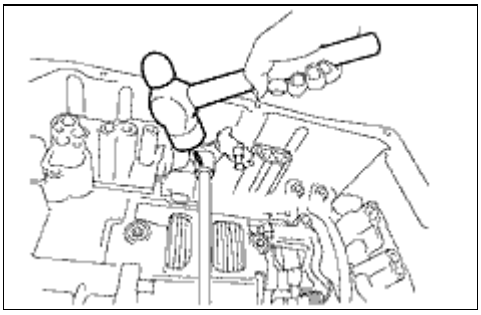
Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Spacer

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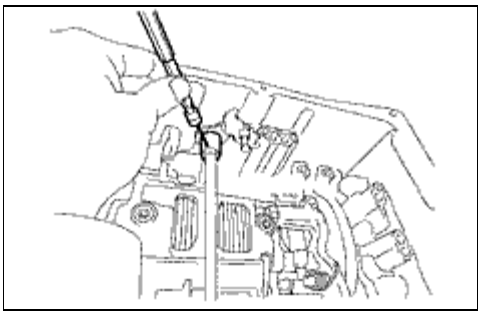
(b) Install the manual valve lever shaft to the automatic transmission case sub-assembly through the manual valve lever sub-assembly.

(c) Using a hammer, drive in a new spring pin.



(d) Turn the spacer and manual valve lever shaft to align the smaller hole on the spacer with the indent on the manual valve lever sub-assembly.

(e) Using a 3 mm pin punch and a hammer, stake the spacer.



(f) Check that the spacer does not turn.

(g) Make sure that the shaft rotates smoothly.

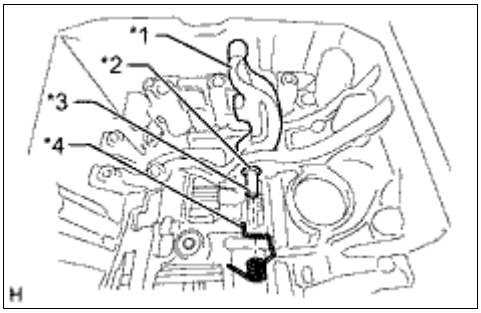
47. INSTALL PARKING LOCK PAWL SHAFT

(a) Install the E-ring to the parking lock pawl shaft.

(b) Install the parking lock pawl, parking lock pawl shaft and spring to the automatic transmission case sub-assembly.

Text in Illustration

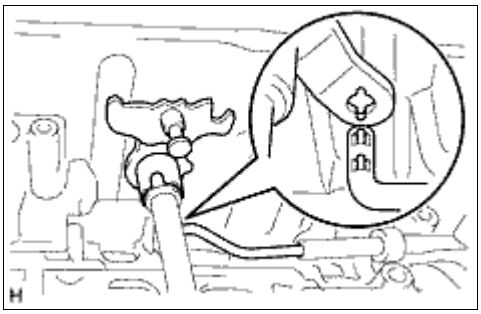
*1	Parking Lock Pawl
*2	E-ring
*3	Parking Lock Pawl Shaft
*4	Spring



48. INSTALL PARKING LOCK ROD SUB-ASSEMBLY

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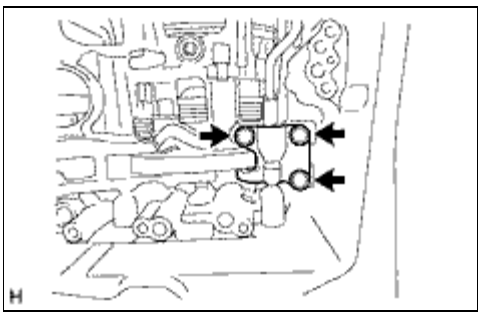
(a) Install the parking lock rod sub-assembly to the manual valve lever sub-assembly.



49. INSTALL PARKING LOCK PAWL BRACKET

(a) Install the parking lock pawl bracket to the automatic transmission case sub-assembly with the 3 bolts.

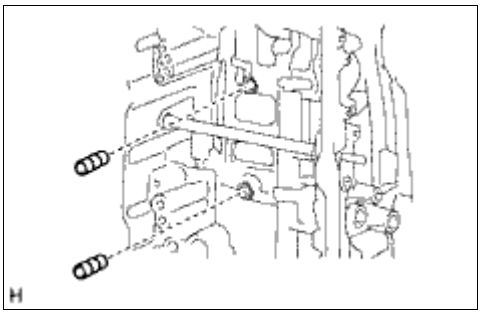
Torque:
18 N·m {184 kgf·cm, 13ft·lbf}



(b) Move the manual valve lever sub-assembly to P, and check the output shaft is locked by the parking lock pawl.

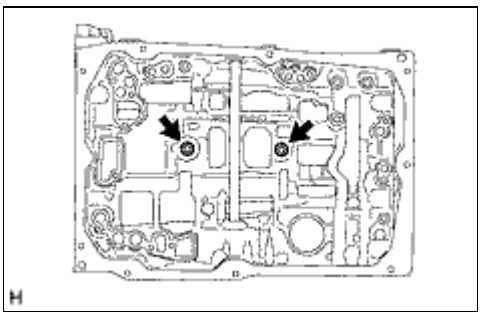
50. INSTALL BRAKE DRUM GASKET

(a) Coat 2 new brake drum gaskets with ATF and install them to the automatic transmission case sub-assembly.



51. INSTALL TRANSMISSION CASE GASKET

(a) Coat 2 new transmission case gaskets with ATF and install them to the automatic transmission case sub-assembly.



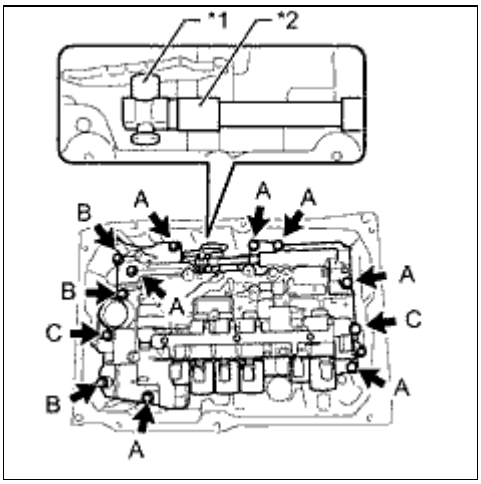
52. INSTALL TRANSMISSION VALVE BODY ASSEMBLY

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(a) Insert the manual valve lever sub-assembly into the groove on the end of the manual valve and install the transmission valve body assembly to the automatic transmission case sub-assembly with the 12 bolts.

Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Manual Valve



Torque:

11 N·m {112 kgf·cm, 8ft·lbf}

HINT:

Each bolt length is indicated below.

Bolt length:

Bolt A

25 mm (0.984 in.)

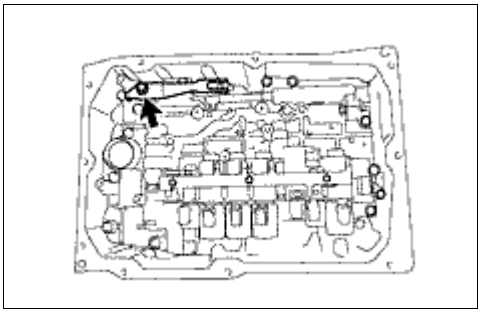
Bolt B

36 mm (1.42 in.)

Bolt C

50 mm (1.97 in.)

(b) Install the detent spring and detent spring cover to the transmission valve body assembly with the bolt.



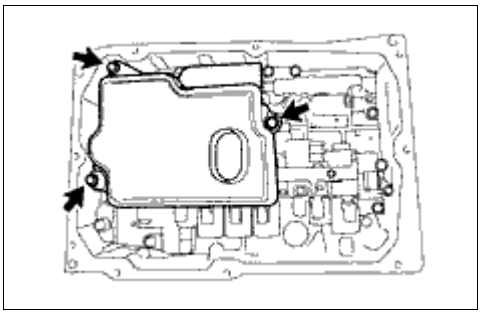
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

53. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the valve body oil strainer assembly.

(b) Install the valve body oil strainer assembly to the transmission valve body assembly with the 3 bolts.



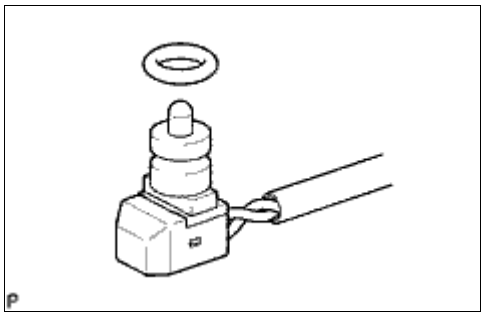
Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

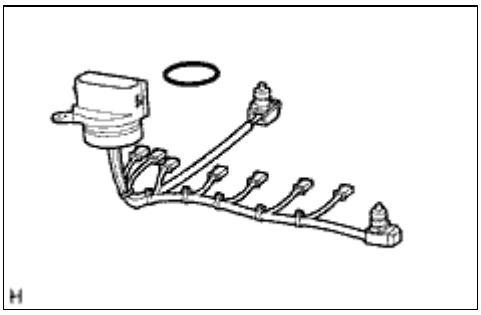
54. INSTALL TRANSMISSION WIRE

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(a) Coat 2 new O-rings with ATF, and install them to the 2 temperature sensors.



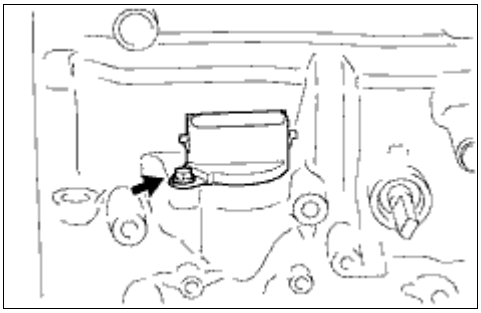
(b) Coat a new O-ring with ATF, and install it to the transmission wire.



(c) Install the transmission wire to the automatic transmission case sub-assembly with the bolt.

Torque:

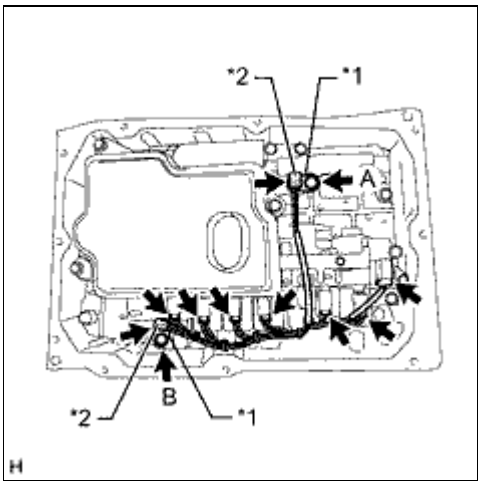
5.4 N·m {55 kgf·cm, 48in·lbf}



(d) Connect the 7 solenoid valve connectors.

Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor



(e) Install the 2 temperature sensors and 2 temperature sensor clamps to the transmission valve body assembly with the bolt.

Torque:

for Bolt A -

10 N·m {102 kgf·cm, 7ft·lbf}

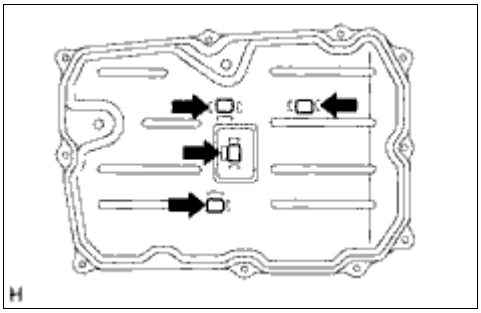
for Bolt B -

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11 N·m {112 kgf·cm, 8ft·lbf}

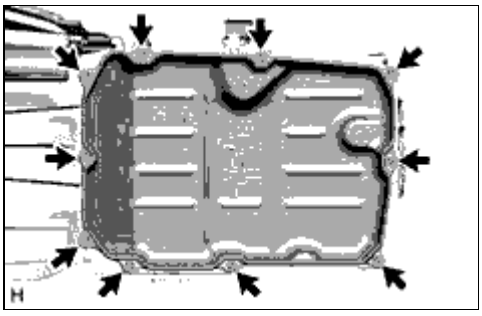
55. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Install the 4 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly as shown in the illustration.



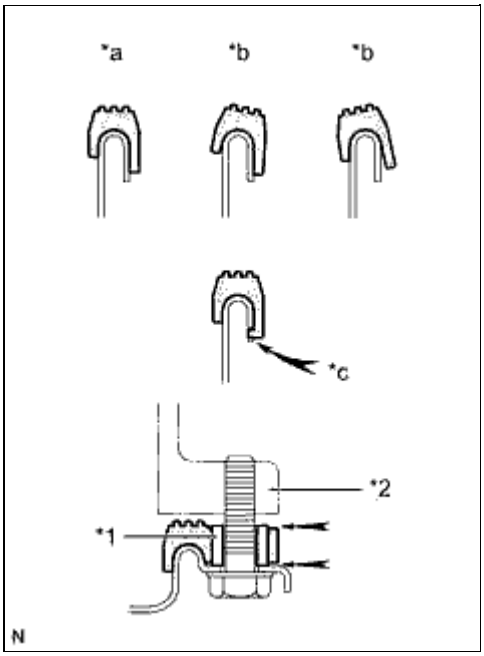
(b) Install a new automatic transmission oil pan gasket to the automatic transmission oil pan sub-assembly.

(c) Install the automatic transmission oil pan sub-assembly with automatic transmission oil pan gasket to the automatic transmission case sub-assembly with the 10 bolts.



Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}



Text in Illustration

*1	Sleeve
*2	Automatic Transmission Case Sub-assembly

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*a	Correct
*b	Incorrect
*c	Protrusion

NOTICE:

- Make sure that automatic transmission oil pan gasket seal surface and automatic transmission oil pan sub-assembly contact surface are free of oil and foreign matter.
- Install the automatic transmission oil pan gasket so that there is no slack in the automatic transmission oil pan gasket, and the entire seal surface is level.
- Make sure that the 8 protrusions are properly engaged to the automatic transmission oil pan sub-assembly.
- When installing the automatic transmission oil pan sub-assembly, make sure that the automatic transmission oil pan gasket is not pinched between the sleeve and the seal surface of the automatic transmission case sub-assembly.

(d) Install the drain plug and a new gasket to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

(e) Using a 5 mm hexagon socket wrench, install a new gasket and overflow plug to the automatic transmission oil pan sub-assembly.

Torque:

20 N·m {204 kgf·cm, 15ft·lbf}

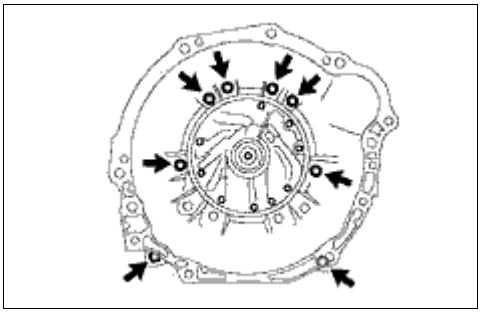
56. INSTALL AUTOMATIC TRANSMISSION HOUSING

(a) Clean and degrease the bolts and bolt holes with non-residue solvent.

(b) Install the automatic transmission housing to the automatic transmission case sub-assembly with the 8 bolts.

Torque:

34 N·m {346 kgf·cm, 25ft·lbf}



(c) Apply adhesive to 2 or 3 threads on the end of the 4 bolts.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(d) Install 4 bolts to the automatic transmission housing.

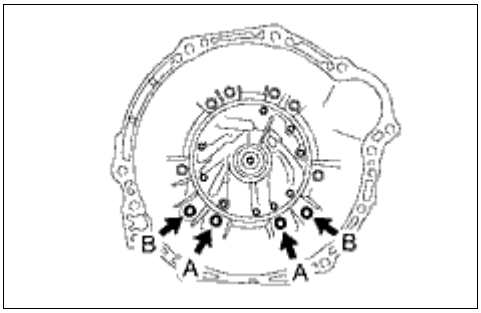
Torque:

for Bolt A (M10 bolt) -

34 N·m {346 kgf·cm, 25ft·lbf}

for Bolt B (M12 bolt) -

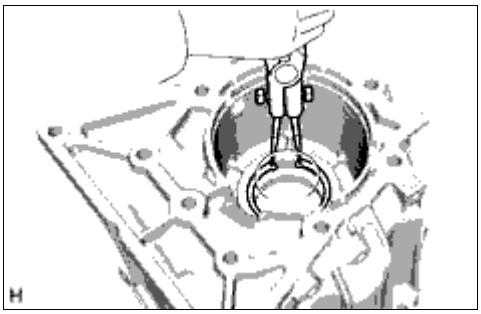
57 N·m {579 kgf·cm, 42ft·lbf}



57. INSTALL REAR TRANSFER CASE ADAPTER OIL RECEIVER

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(a) Install the rear transfer case adapter oil receiver to the rear transfer adapter.



(b) Using snap ring pliers, install the snap ring to the rear transfer adapter.

58. INSTALL TRANSFER ADAPTER OIL SEAL

(a) Using SST and a hammer, drive in a new transfer adapter oil seal to the rear transfer adapter.

SST: 09950-60010

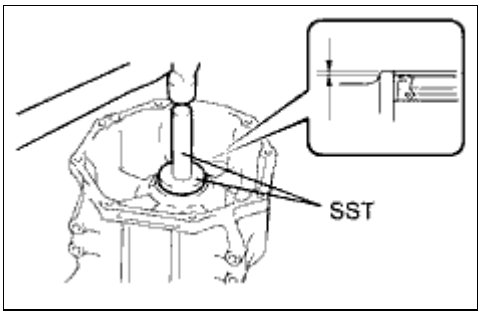
09951-00650

SST: 09950-70010

09951-07150

Standard depth:

0 to 0.5 mm (0 to 0.0196 in.)



(b) Coat the lip of the transfer adapter oil seal with MP grease.

59. INSTALL REAR TRANSFER ADAPTER

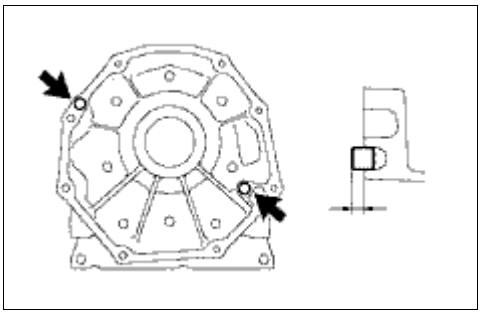
(a) Using a plastic-faced hammer, tap 2 new straight pins into the rear transfer adapter.

Standard protrusion height:

5.7 to 6.3 mm (0.225 to 0.248 in.)

HINT:

It is not necessary to remove the straight pins they are being replaced.

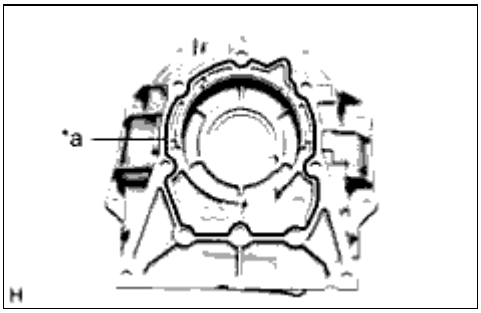


(b) Clean and degrease the threads of the 10 bolts, bolt holes and the contact surfaces of the automatic transmission case sub-assembly and rear transfer adapter with non-residue solvent.

(c) Apply seal packing to the rear transfer adapter as shown in the illustration.

Text in Illustration

*a	Seal Packing



Seal packing:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

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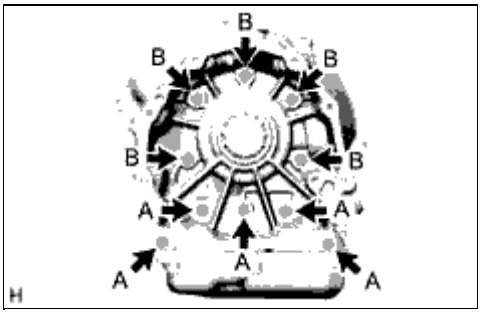
- Apply seal packing in a continuous line (width 1.2 mm (0.0472 in.)) along the sealing surface.
- After applying seal packing, install the rear transfer adapter to the automatic transmission case sub-assembly within 3 minutes and tighten the bolts within 10 minutes.

(d) Apply adhesive to 2 or 3 threads on the end of the 10 bolts.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(e) Install the rear transfer adapter to the automatic transmission case sub-assembly with the 10 bolts.

Torque:
34 N·m {346 kgf·cm, 25ft·lbf}



HINT:

Each bolt length is indicated below.

Bolt length:

for Bolt A

40 mm (1.57 in.)

for Bolt B

50 mm (1.97 in.)

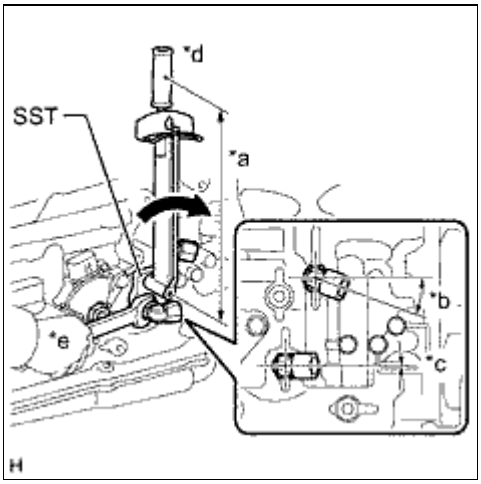
60. INSTALL OIL COOLER TUBE UNION

(a) Coat 2 new O-rings with ATF and install them to the 2 oil cooler tube unions.

(b) Using SST, install the 2 oil cooler tube unions to the automatic transmission case sub-assembly.

Text in Illustration

*a	Torque Wrench Fulcrum Length
*b	18° to 22°
*c	-2° to 2°
*d	Turn
*e	Hold



SST: 09268-78010

Torque:
29 N·m {300 kgf·cm, 22ft·lbf}

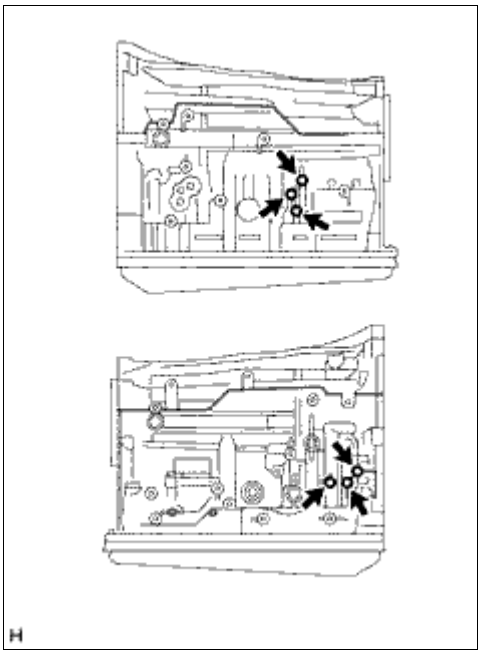
HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using SST (fulcrum length of 34.5 mm (1.36 in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 25 N*m (252 kgf*cm, 18 ft.*lbf)

61. INSTALL AUTOMATIC TRANSMISSION CASE PLUG

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(a) Coat 6 new O-rings with ATF, and install them to the 6 automatic transmission case plugs.

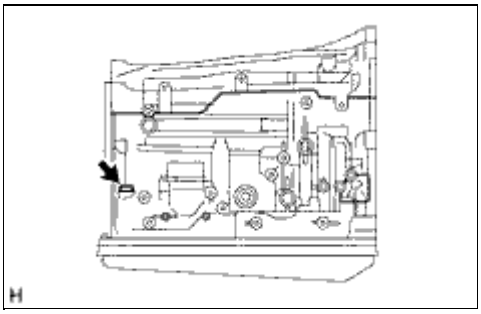


(b) Install the 6 automatic transmission case plugs to the automatic transmission case sub-assembly.

Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}

(c) Coat a new O-ring with ATF, and install it to the automatic transmission case plug.



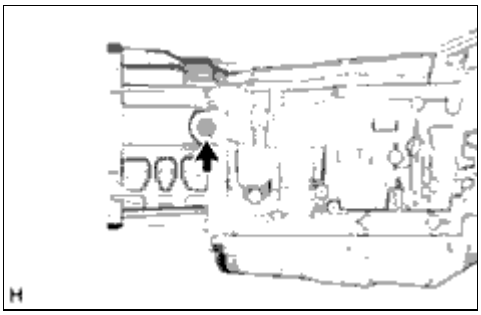
(d) Using a T55 "TORX" socket wrench, install the automatic transmission case plug to the automatic transmission case sub-assembly.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}

62. INSTALL REFILL PLUG

(a) Coat a new O-ring with ATF, and install it to the refill plug.



(b) Install the refill plug to the rear transfer adapter.

Torque:

39 N·m {400 kgf·cm, 29ft·lbf}

63. INSTALL PARK/NEUTRAL POSITION SWITCH

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

(a) Clean the bolt and bolt hole.

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(b) Apply adhesive to 2 or 3 threads on the end of the bolt.

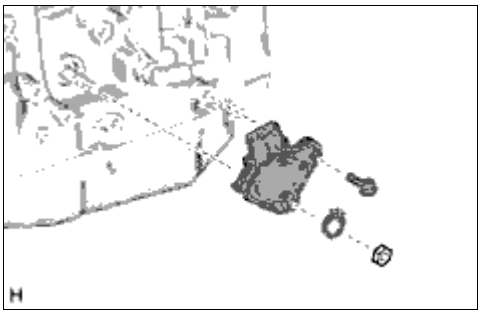
Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

Install the bolt within 3 minutes of applying adhesive.

(c) Temporarily install the park/neutral position switch to the automatic transmission case sub-assembly with the bolt.



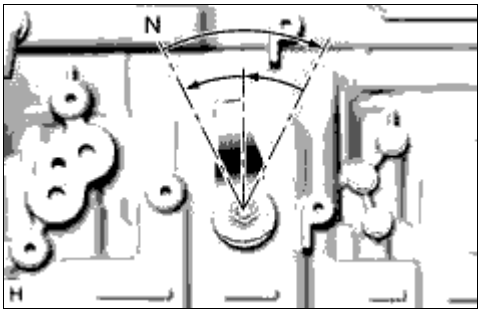
(d) Install a lock washer and nut to the park/neutral position switch.

Torque:

6.9 N·m {70 kgf·cm, 61in·lbf}

(e) Temporarily install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

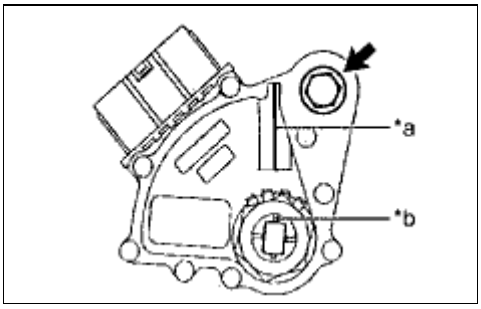
(f) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(g) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.

Text in Illustration

*a	Neutral Basic Line
*b	Groove



Torque:

13 N·m {131 kgf·cm, 9ft·lbf}

(h) Using a screwdriver, bend the tabs of the lock washer.

NOTICE:

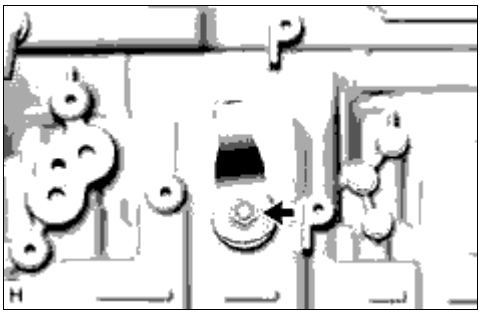
- Be careful not to damage the park/neutral position switch.
- Bend at least 2 of the lock washer tabs.

HINT:

Tape the screwdriver tip before use.

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64. INSTALL TRANSMISSION CONTROL SHAFT LEVER LH

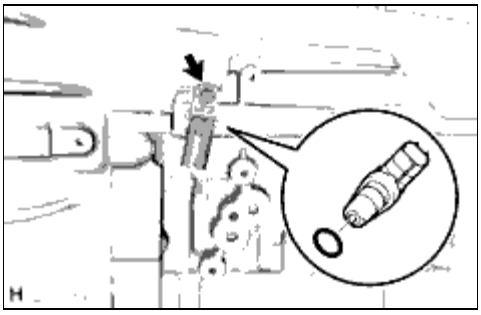


(a) Install the transmission control shaft lever LH to the manual valve lever shaft with the spring washer and nut.

Torque:

16 N·m {160 kgf·cm, 12ft·lbf}

65. INSTALL TRANSMISSION REVOLUTION SENSOR

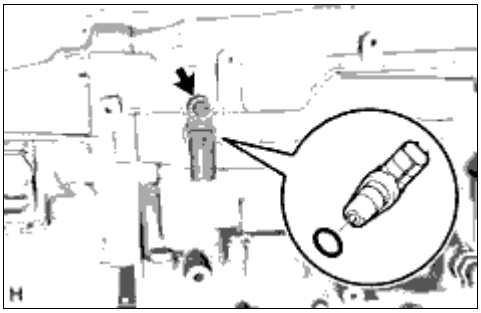


(a) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (NT).

(b) Install the transmission revolution sensor (NT) to the automatic transmission case sub-assembly with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}



(c) Coat a new O-ring with ATF, and install it to the transmission revolution sensor (SP2).

(d) Install the transmission revolution sensor (SP2) to the automatic transmission case sub-assembly with the bolt.

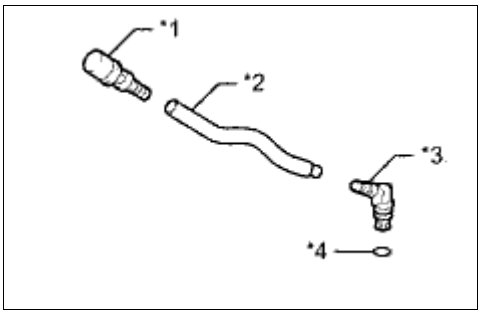
Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

66. INSTALL BREATHER PLUG HOSE

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(a) Install the breather plug sub-assembly and breather plug to the breather plug hose.

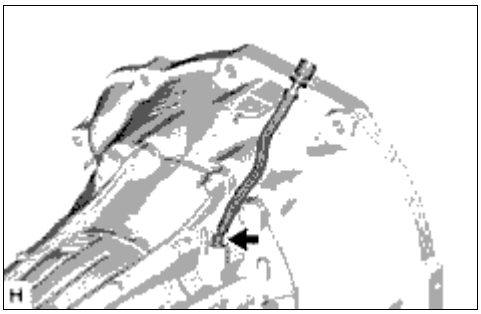


Text in Illustration

*1	Breather Plug Sub-assembly
*2	Breather Plug Hose
*3	Breather Plug
*4	O-ring

(b) Coat a new O-ring with ATF, and install it to the breather plug.

(c) Install the breather plug hose to the automatic transmission case sub-assembly.



NOTICE:

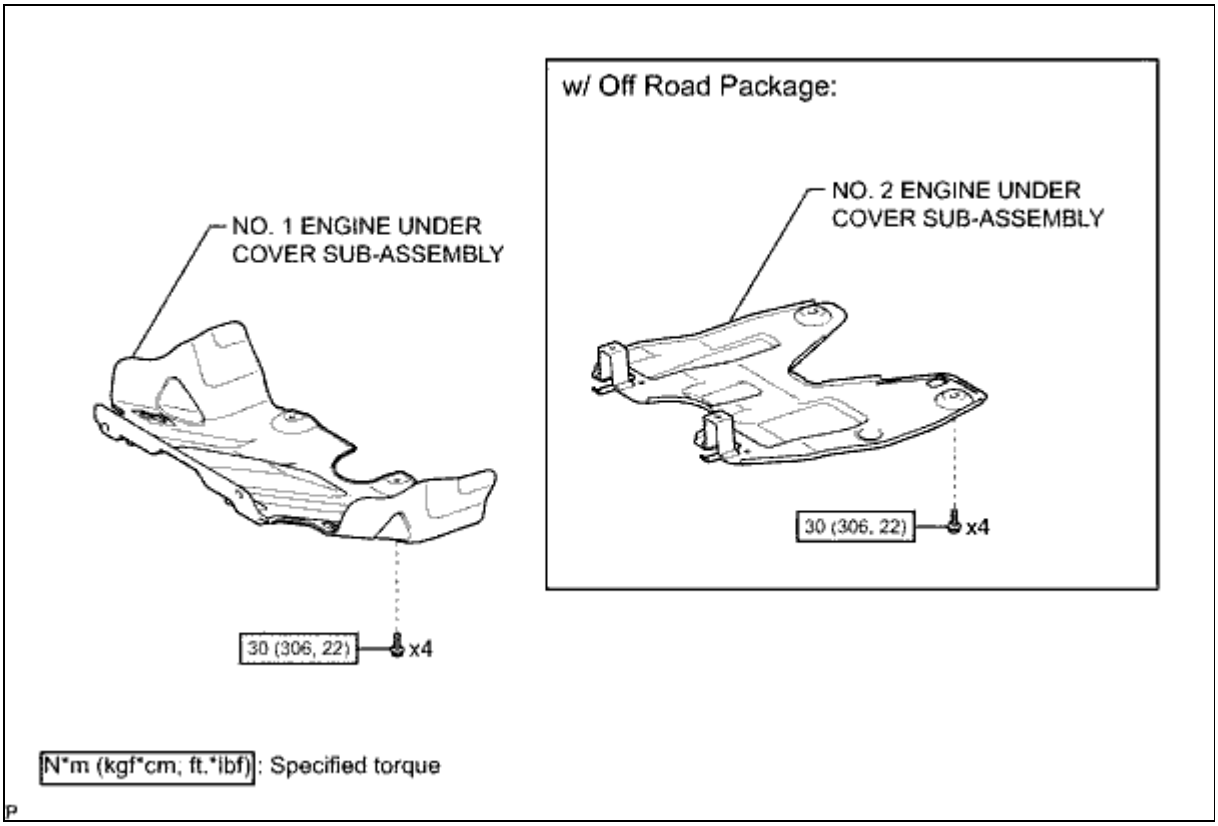
Be careful not to damage the O-rings.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000001BZC03IX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL COOLER (for 2GR-FKS): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

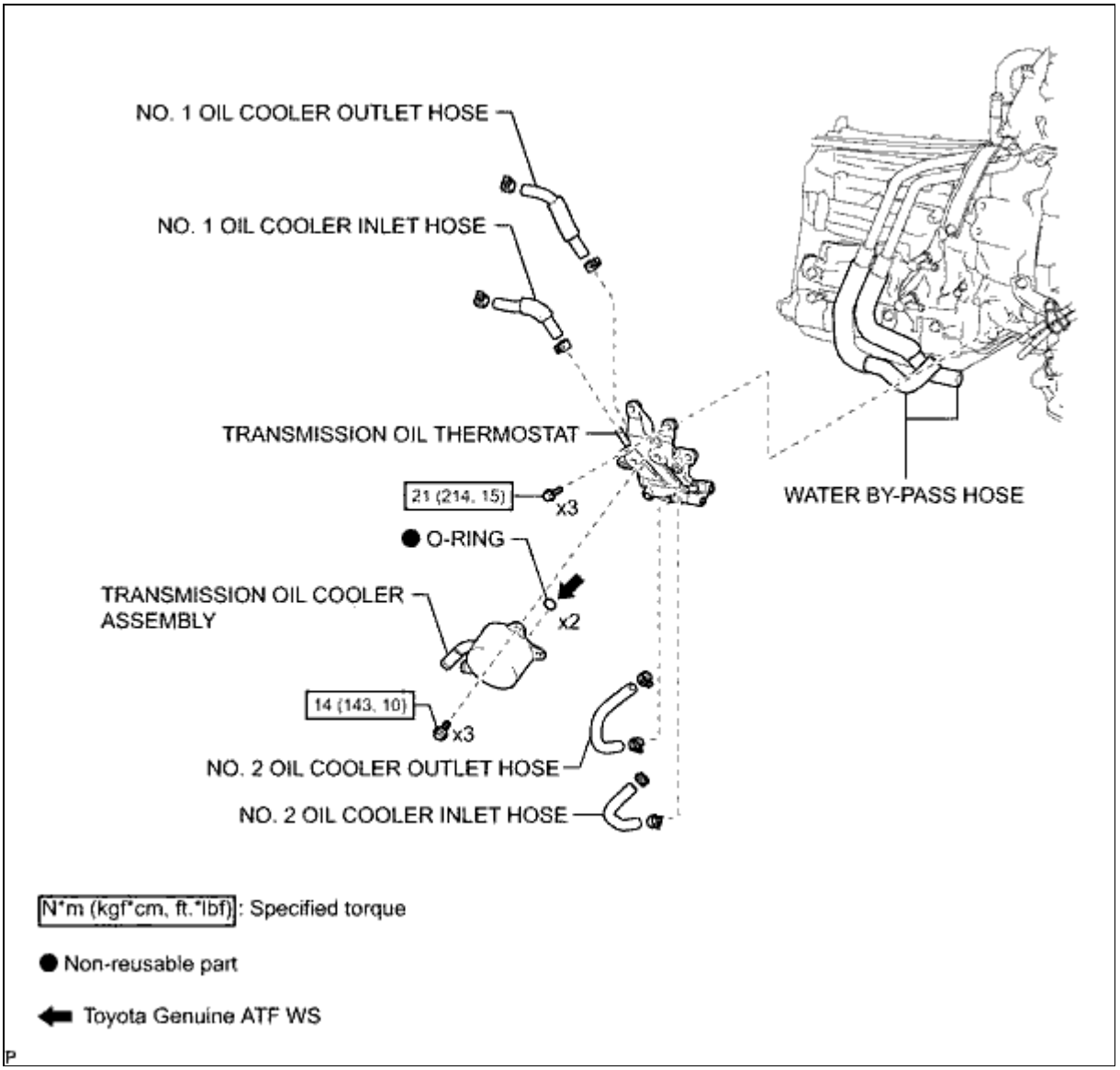
COMPONENTS

ILLUSTRATION



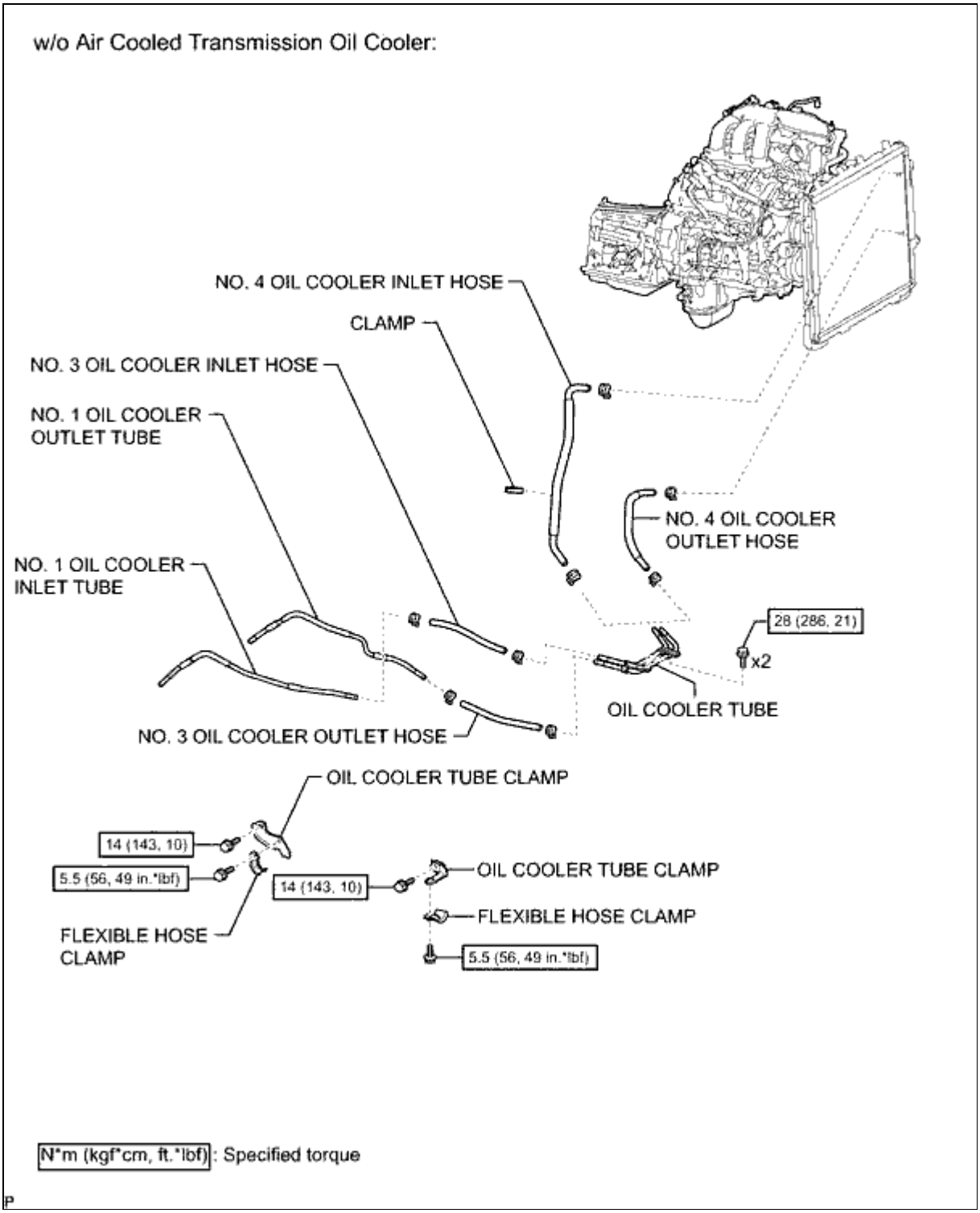
ILLUSTRATION

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ILLUSTRATION

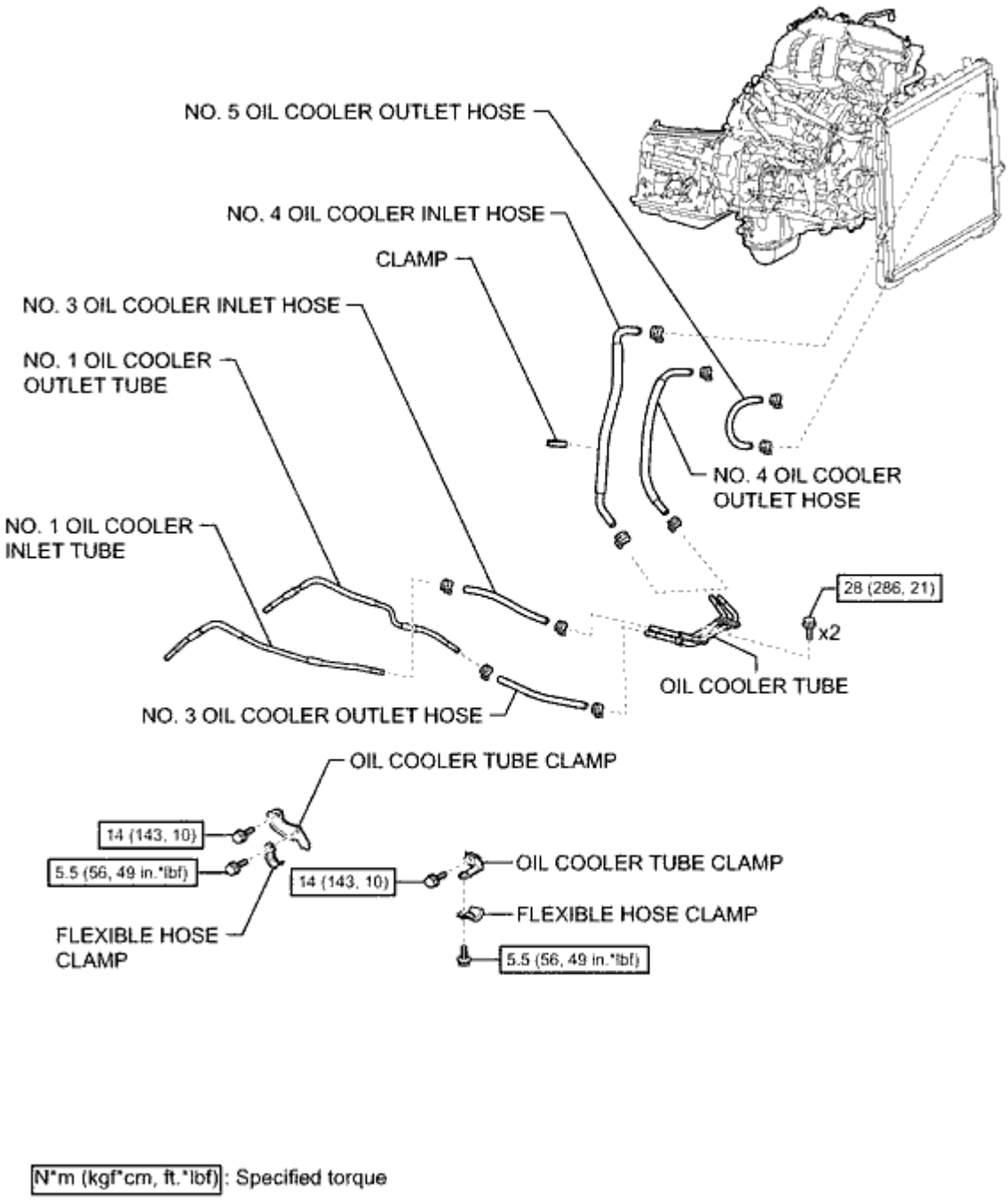
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ILLUSTRATION

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w/ Air Cooled Transmission Oil Cooler:



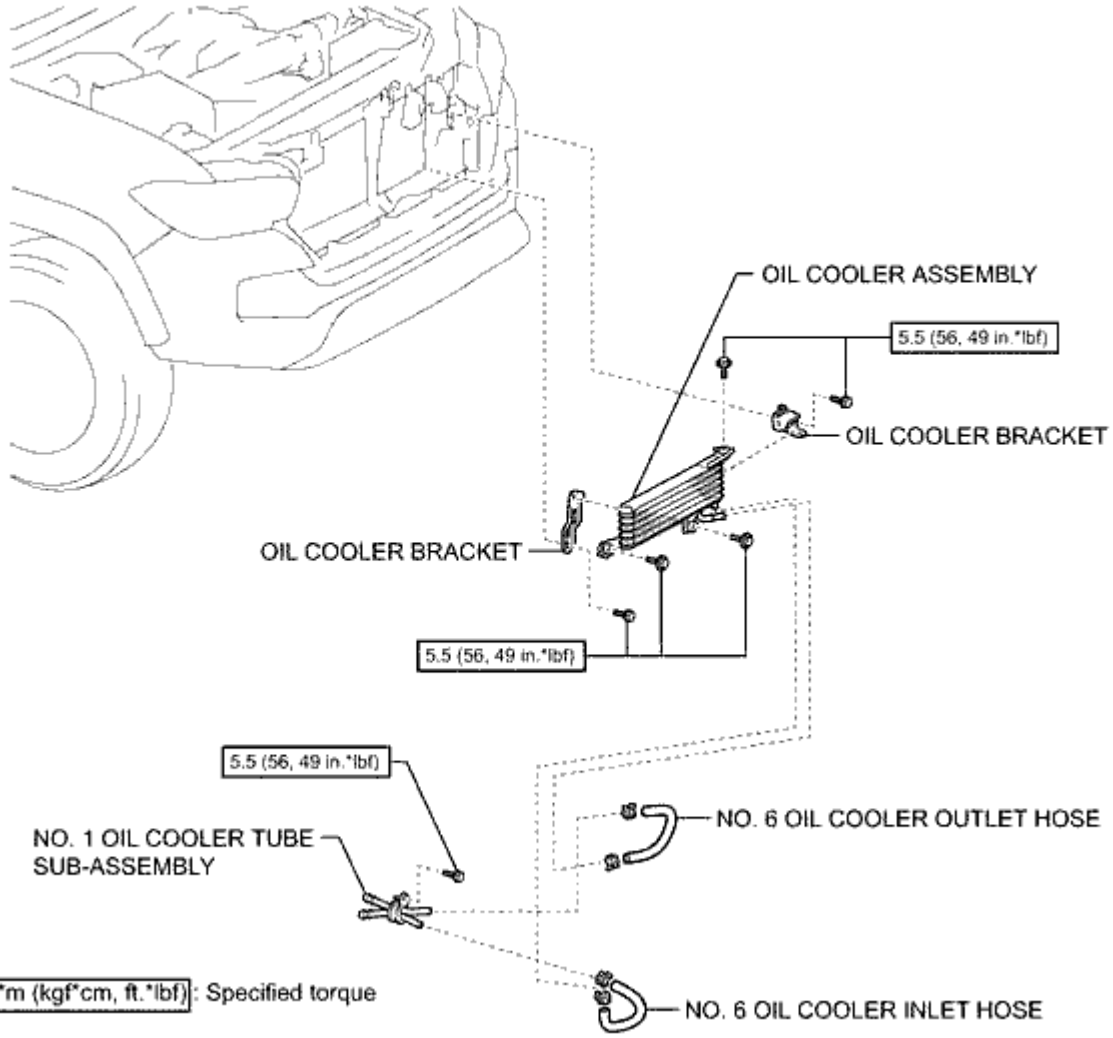
N*m (kgf*cm, ft.*lbf): Specified torque

P

ILLUSTRATION

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w/ Air Cooled Transmission Oil Cooler:



P

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000001BZB04YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL COOLER (for 2GR-FKS): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL OIL COOLER ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

(a) Install the 2 oil cooler brackets to the oil cooler assembly with the 2 bolts.

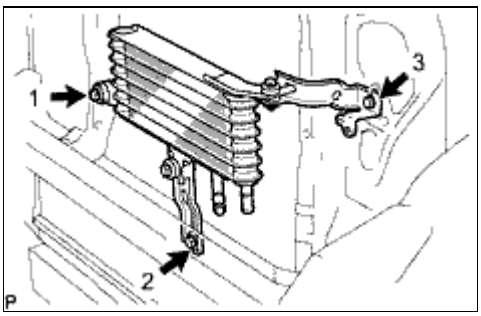
Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(b) Install the oil cooler assembly to the vehicle body with the 3 bolts in the order shown in the illustration.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}



2. INSTALL NO. 1 OIL COOLER TUBE SUB-ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

(a) Install the No.1 oil cooler tube sub-assembly to the oil cooler bracket with the bolt.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

3. INSTALL NO. 6 OIL COOLER INLET HOSE AND NO. 6 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose to the oil cooler assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose to the No.1 oil cooler tube sub-assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

4. INSTALL OIL COOLER TUBE

(a) Install the oil cooler tube to the vehicle body with the 2 bolts.

Torque:

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28 N·m {286 kgf·cm, 21ft·lbf}

5. INSTALL NO. 5 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 5 oil cooler outlet hose to the No.1 oil cooler tube sub-assembly, and slide the clip to secure it.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 5 oil cooler outlet hose to the radiator assembly, and slide the clip to secure it.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

6. INSTALL NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) w/o Air Cooled Transmission Oil Cooler:

(1) Install the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the radiator assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) w/ Air Cooled Transmission Oil Cooler:

(1) Install the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the radiator assembly and No.1 oil cooler tube sub-assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(c) Connect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(d) Then pass the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose through the clamp and close the clamp.

7. INSTALL NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

(a) Install the 2 oil cooler tube clamps to the automatic transmission assembly and engine assembly with the 2 bolts.

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Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Install the No. 1 oil cooler inlet tube, No. 1 oil cooler outlet tube and 2 flexible hose clamps to the 2 oil cooler tube clamps with the 2 bolts.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

8. INSTALL NO. 3 OIL COOLER INLET HOSE AND NO. 3 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose to the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

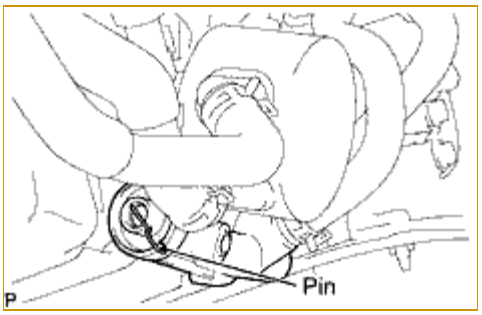
NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

9. INSTALL TRANSMISSION OIL COOLER ASSEMBLY

NOTICE:

- When the transmission oil thermostat is replaced with a new one, pull out the pin from the new transmission oil thermostat.



- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Coat 2 new O-rings with ATF, and install them to the transmission oil cooler assembly.

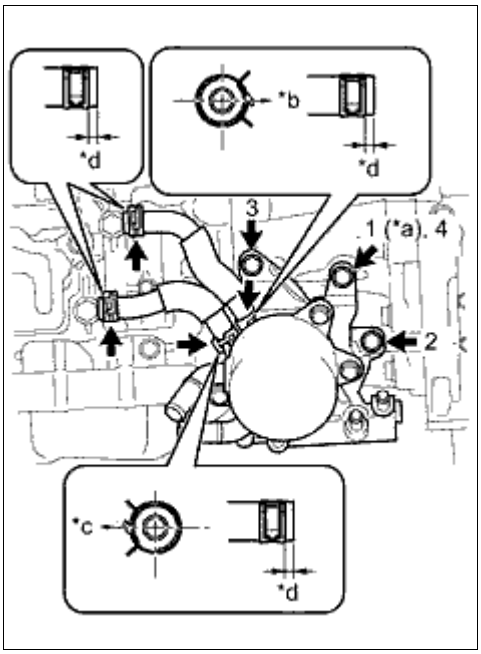
(b) Align the transmission oil cooler assembly with the transmission oil thermostat and assemble them with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

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(c) Install the transmission oil cooler assembly with transmission oil thermostat to the automatic transmission assembly with the 3 bolts in the order shown in the illustration.



Text in Illustration

*a	Temporarily Tighten
*b	Front Side
*c	Rear Side
*d	2 to 7 mm (0.0788 to 0.2755 in.)

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

(d) Install the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the transmission oil thermostat, and slide the 2 clips to secure them.

NOTICE:

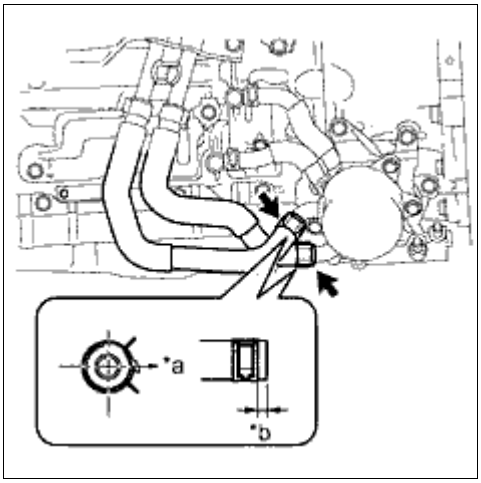
Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(e) Connect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the automatic transmission assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(f) Connect the 2 water by-pass hoses to the transmission oil cooler assembly, and slide the 2 clips to secure them.



Text in Illustration

*a	RH Side
*b	2 to 7 mm (0.0788 to 0.2755 in.)

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

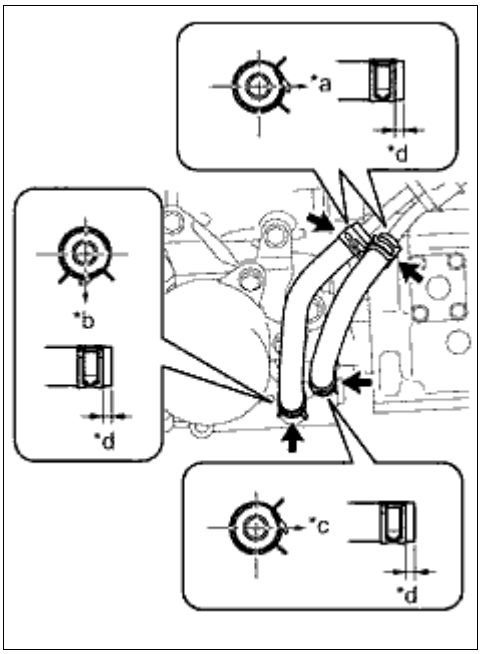
10. INSTALL NO. 2 OIL COOLER INLET HOSE AND NO. 2 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

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(a) Install the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose to the transmission oil thermostat, and slide the 2 clips to secure them.



Text in Illustration

*a	RH Side
*b	Lower Side
*c	Front Side
*d	2 to 7 mm (0.0788 to 0.2755 in.)

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose to the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

11. INSTALL EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

12. INSTALL RADIATOR GRILLE

INFO

13. ADD ENGINE COOLANT INFO

14. ADD AUTOMATIC TRANSMISSION FLUID

INFO

15. INSPECT FOR COOLANT LEAK INFO

16. INSPECT FOR AUTOMATIC TRANSMISSION FLUID LEAK

17. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

18. INSTALL NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000001BZD04TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL COOLER (for 2GR-FKS): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. REMOVE NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

2. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

3. DRAIN ENGINE COOLANT INFO

4. REMOVE RADIATOR GRILLE

INFO

5. REMOVE EXHAUST MANIFOLD SUB-ASSEMBLY RH

INFO

6. REMOVE NO. 2 OIL COOLER INLET HOSE AND NO. 2 OIL COOLER OUTLET HOSE

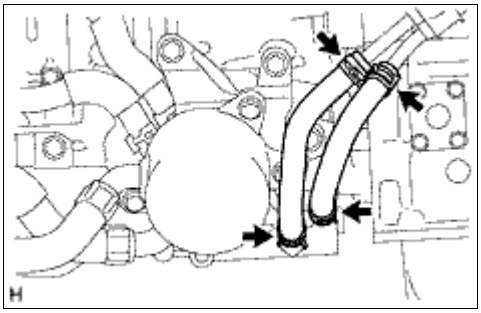
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

(a) Slide the 2 clips and disconnect the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose from the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.



(b) Slide the 2 clips and remove the No. 2 oil cooler inlet hose and No. 2 oil cooler outlet hose from the transmission oil thermostat.

7. REMOVE TRANSMISSION OIL COOLER ASSEMBLY

NOTICE:

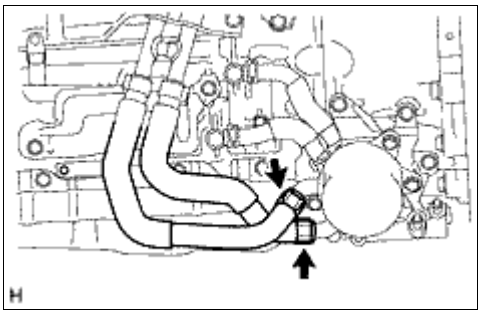
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

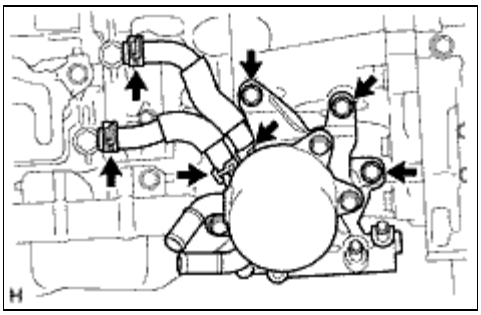
Use a container to catch any ATF and coolant.

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(a) Slide the 2 clips and disconnect the 2 water by-pass hoses from the transmission oil cooler assembly.



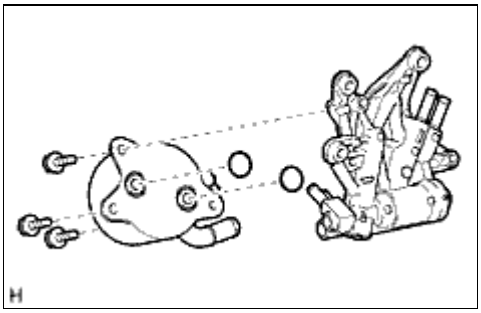
(b) Slide the 2 clips and disconnect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the automatic transmission assembly.



(c) Slide the 2 clips and remove the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the transmission oil thermostat.

(d) Remove the 3 bolts and transmission oil cooler assembly with transmission oil thermostat from the automatic transmission assembly.

(e) Remove the 3 bolts and transmission oil cooler assembly from the transmission oil thermostat.



(f) Remove the 2 O-rings from the grooves of transmission oil cooler assembly.

8. REMOVE NO. 3 OIL COOLER INLET HOSE AND NO. 3 OIL COOLER OUTLET HOSE

NOTICE:

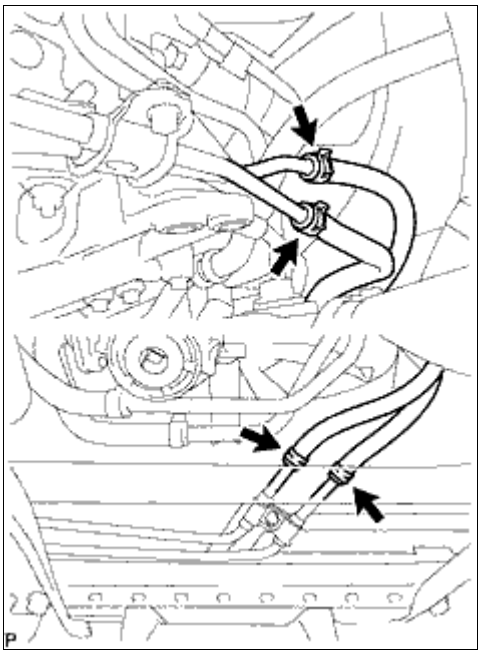
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

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(a) Slide the 2 clips and disconnect the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose from the oil cooler tube.



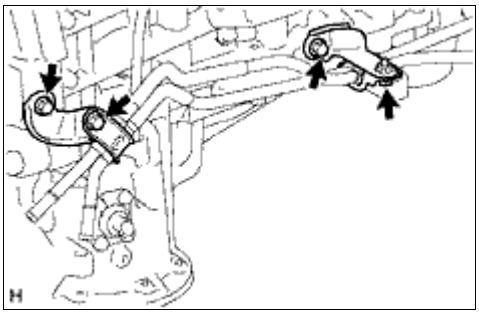
(b) Slide the 2 clips and remove the No. 3 oil cooler inlet hose and No. 3 oil cooler outlet hose from the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.

9. REMOVE NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

HINT:

Use a container to catch any ATF.

(a) Remove the 2 bolts, 2 flexible hose clamps, No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.



(b) Remove the 2 bolts and 2 oil cooler tube clamps from the automatic transmission assembly and engine assembly.

10. REMOVE NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

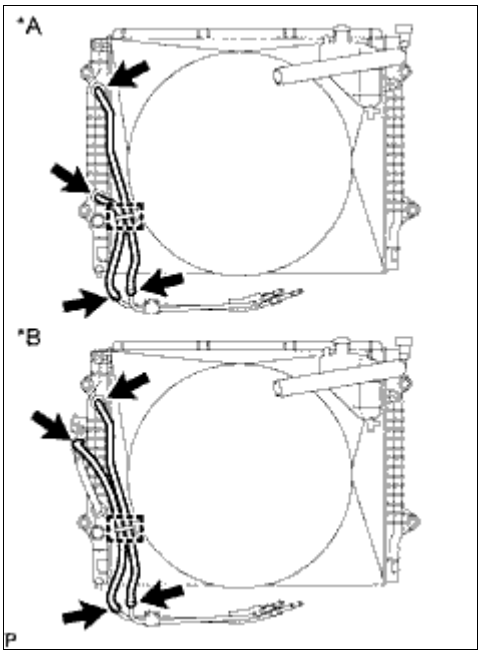
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

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(a) Detach the claw to open the clamp.



Text in Illustration

*A	w/o Air Cooled Transmission Oil Cooler
*B	w/ Air Cooled Transmission Oil Cooler

(b) Slide the 2 clips and disconnect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the oil cooler tube.

(c) w/o Air Cooled Transmission Oil Cooler:

(1) Slide the 2 clips and remove the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the radiator assembly.

(d) w/ Air Cooled Transmission Oil Cooler:

(1) Slide the 2 clips and remove the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the radiator assembly and No.1 oil cooler tube sub-assembly.

11. REMOVE NO. 5 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

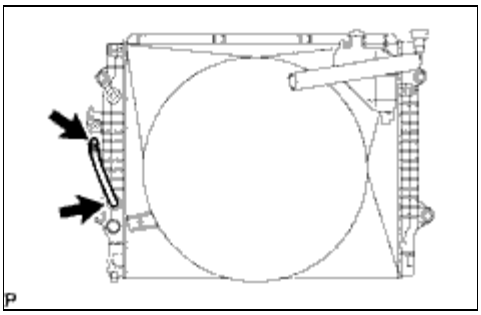
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

(a) Slide the clip and disconnect the No. 5 oil cooler outlet hose from the radiator assembly.

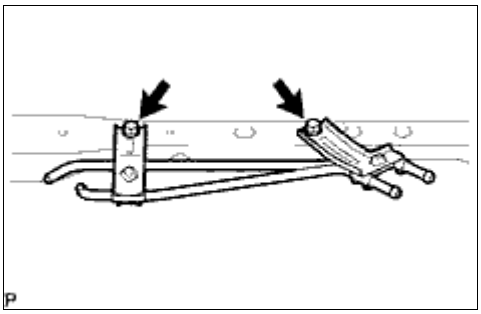


(b) Slide the clip and remove the No. 5 oil cooler outlet hose from the No.1 oil cooler tube sub-assembly.

12. REMOVE OIL COOLER TUBE

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(a) Remove the 2 bolts and oil cooler tube from the vehicle body.



13. REMOVE NO. 6 OIL COOLER INLET HOSE AND NO. 6 OIL COOLER OUTLET HOSE (w/ Air Cooled Transmission Oil Cooler)

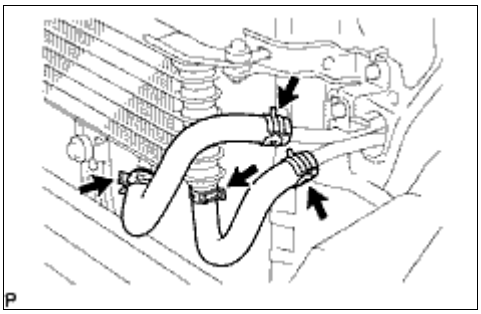
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

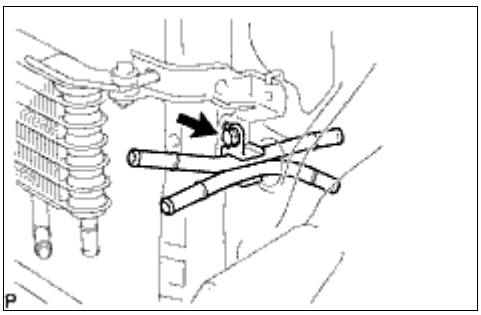
(a) Slide the 2 clips and disconnect the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose from the No.1 oil cooler tube sub-assembly.



(b) Slide the 2 clips and remove the No. 6 oil cooler inlet hose and No. 6 oil cooler outlet hose from the oil cooler assembly.

14. REMOVE NO. 1 OIL COOLER TUBE SUB-ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

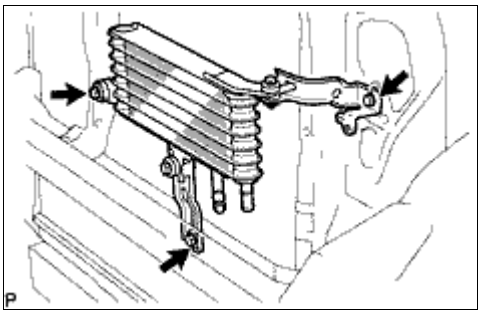
(a) Remove the bolt and No.1 oil cooler tube sub-assembly from the oil cooler bracket.



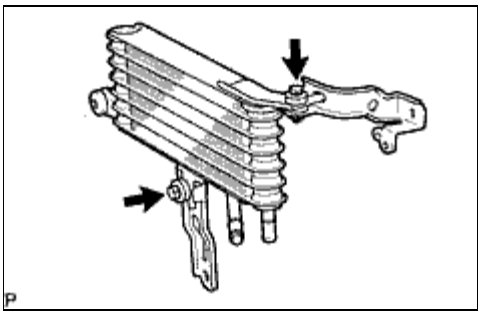
15. REMOVE OIL COOLER ASSEMBLY (w/ Air Cooled Transmission Oil Cooler)

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(a) Remove the 3 bolts and oil cooler assembly from the vehicle body.



(b) Remove the 2 bolts and 2 oil cooler brackets from the oil cooler assembly.

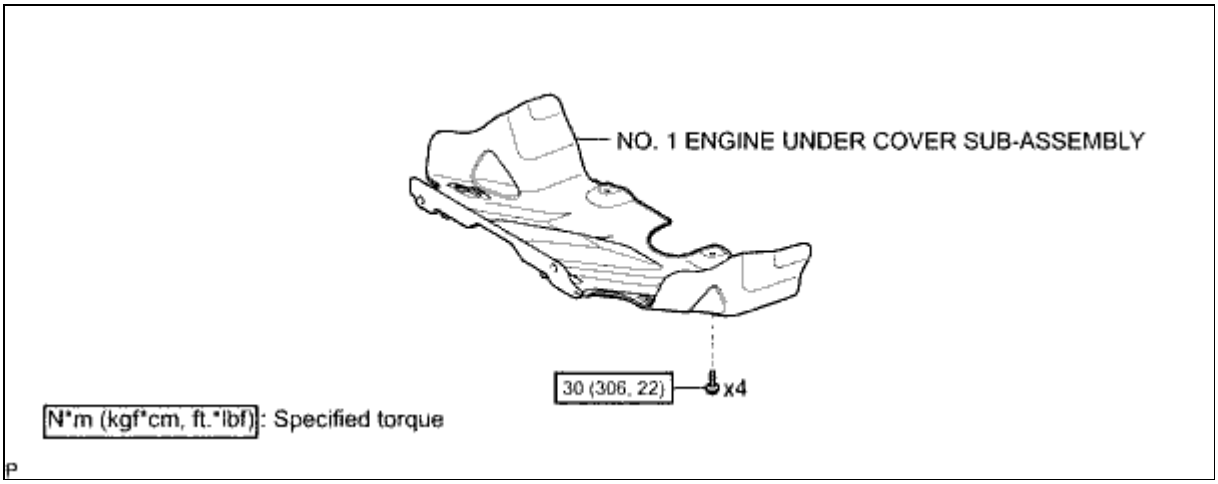


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM00000454X00FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL COOLER (for 2TR-FE): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

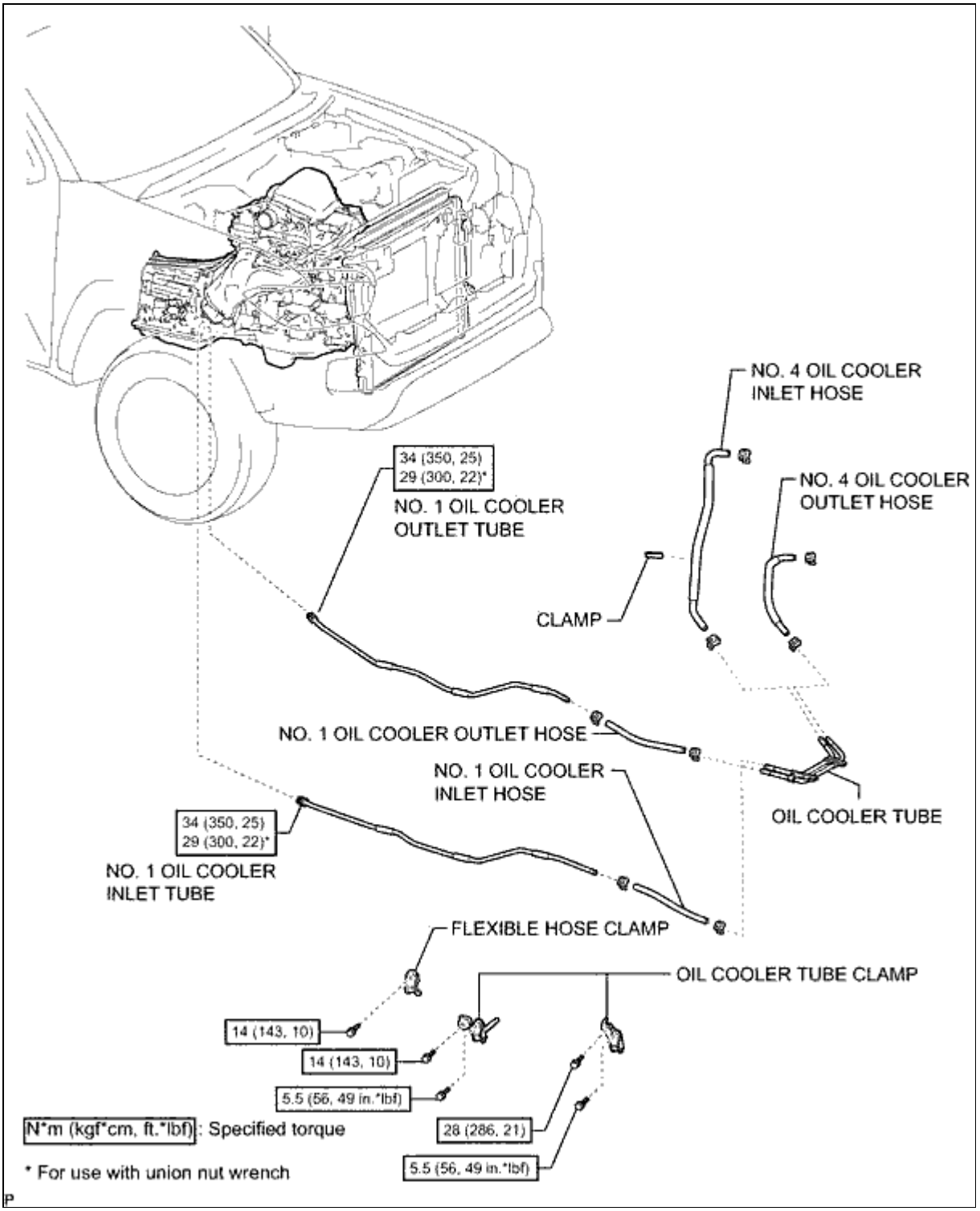
COMPONENTS

ILLUSTRATION



ILLUSTRATION

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000454W00FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL COOLER (for 2TR-FE): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL OIL COOLER TUBE

(a) Install the oil cooler tube to the vehicle body with the 2 bolts.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

2. INSTALL NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the radiator assembly, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(b) Connect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

(c) Then pass the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose through the clamp and close the clamp.

3. INSTALL NO. 1 OIL COOLER INLET HOSE AND NO. 1 OIL COOLER OUTLET HOSE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

(a) Install the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the oil cooler tube, and slide the 2 clips to secure them.

NOTICE:

Make sure to install any hose clips without a specific installation direction in a direction that does not interfere with other parts.

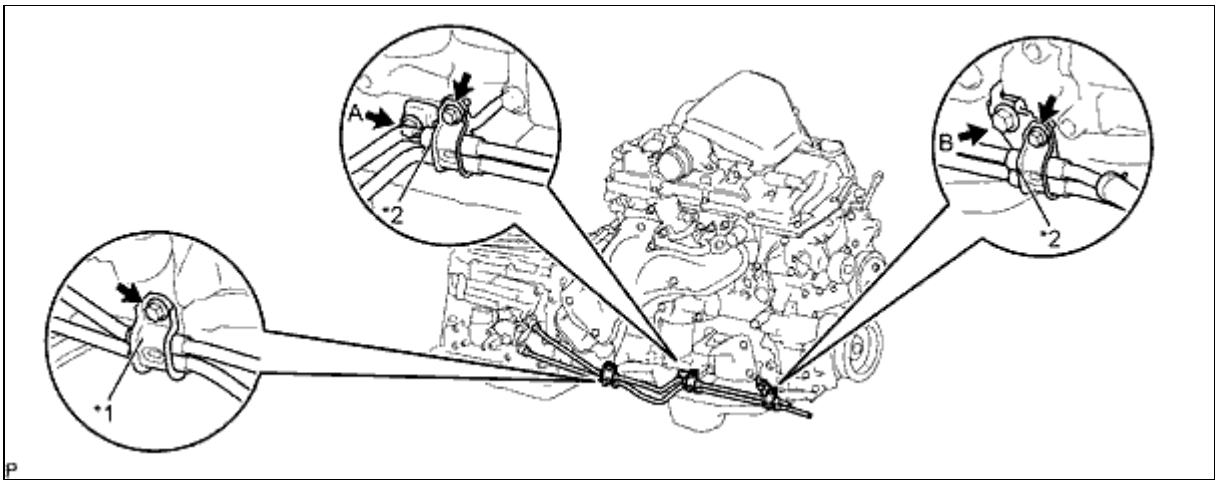
4. INSTALL NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

NOTICE:

- When connecting the hoses to the tube, support the tube by hand and be careful to prevent the tube from being deformed.
- Make sure to install the clips so that the spool fitting is not overlapped.

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(a) Install the 2 oil cooler tube clamps to the engine assembly with the 2 bolts.



Text in Illustration

*1	Flexible Hose Clamp	*2	Oil Cooler Tube Clamp

Torque:

for Bolt A -

14 N·m {143 kgf·cm, 10ft·lbf}

for Bolt B -

28 N·m {286 kgf·cm, 21ft·lbf}

(b) Connect the ends of the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube to the automatic transmission assembly by hand.

(c) Close the 2 oil cooler tube clamps and install the 2 bolts.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(d) Install the flexible hose clamp to the automatic transmission assembly with the bolt.

Torque:

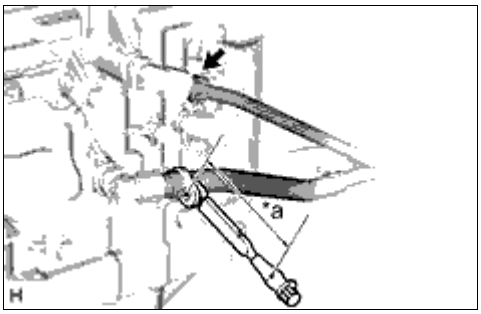
14 N·m {143 kgf·cm, 10ft·lbf}

(e) Connect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose to the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube, and slide the 2 clips to secure them.

(f) Using a 17 mm union nut wrench, tighten the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.

Text in Illustration

*a	Torque Wrench Fulcrum Length



Torque:

Specified tightening torque -

34 N·m {350 kgf·cm, 25ft·lbf}

HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using a union nut wrench (fulcrum length of 30 mm (1.18

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in.)) + torque wrench (fulcrum length of 180 mm (7.09 in.)): 29 N*m (300 kgf*cm, 22 ft.*lbf)

5. INSTALL FRONT EXHAUST PIPE ASSEMBLY

INFO

6. ADD AUTOMATIC TRANSMISSION FLUID

INFO

7. INSPECT FOR AUTOMATIC TRANSMISSION FLUID LEAK

8. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000454Y00FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL COOLER (for 2TR-FE): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

2. REMOVE FRONT EXHAUST PIPE ASSEMBLY

INFO

3. REMOVE NO. 1 OIL COOLER INLET TUBE AND NO. 1 OIL COOLER OUTLET TUBE

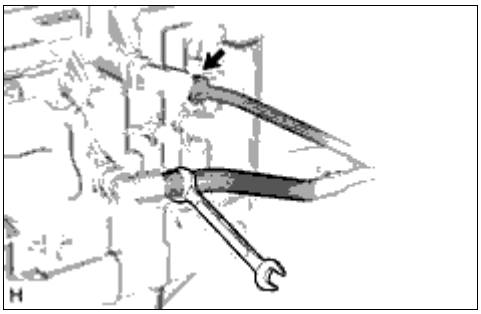
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

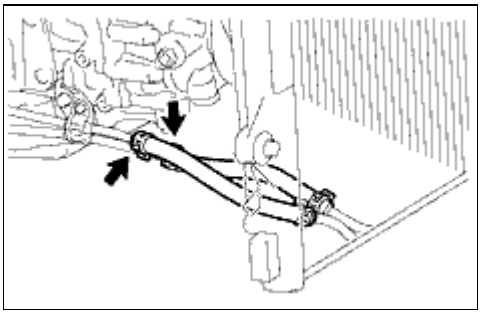
HINT:

Use a container to catch any ATF.

(a) Disconnect the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube from the automatic transmission assembly.

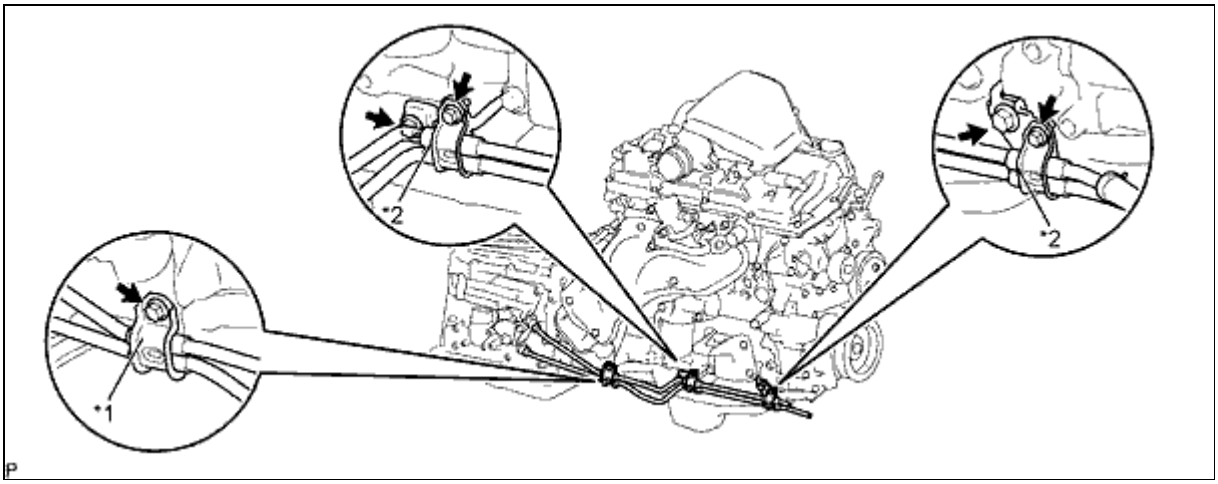


(b) Slide the 2 clips and disconnect the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.



(c) Remove the bolt and flexible hose clamp from the automatic transmission assembly.

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Text in Illustration

*1	Flexible Hose Clamp	*2	Oil Cooler Tube Clamp

(d) Remove the 2 bolts to open the 2 oil cooler tube clamps and remove the No. 1 oil cooler inlet tube and No. 1 oil cooler outlet tube.

(e) Remove the 2 bolts and 2 oil cooler tube clamps from the engine assembly.

4. REMOVE NO. 1 OIL COOLER INLET HOSE AND NO. 1 OIL COOLER OUTLET HOSE

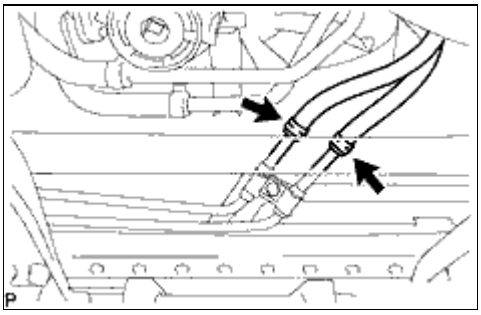
NOTICE:

When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

(a) Slide the 2 clips and remove the No. 1 oil cooler inlet hose and No. 1 oil cooler outlet hose from the oil cooler tube.



5. REMOVE NO. 4 OIL COOLER INLET HOSE AND NO. 4 OIL COOLER OUTLET HOSE

NOTICE:

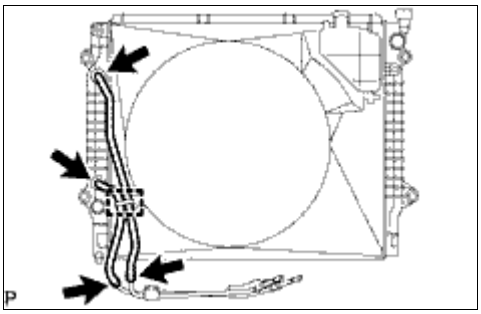
When disconnecting the hoses from the tube, support the tube by hand and be careful to prevent the tube from being deformed.

HINT:

Use a container to catch any ATF.

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(a) Detach the claw to open the clamp.

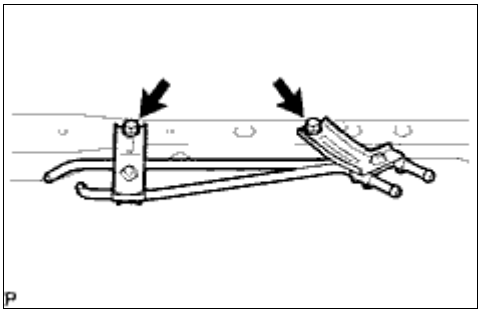


(b) Slide the 2 clips and disconnect the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the oil cooler tube.

(c) Slide the 2 clips and remove the No. 4 oil cooler inlet hose and No. 4 oil cooler outlet hose from the radiator assembly.

6. REMOVE OIL COOLER TUBE

(a) Remove the 2 bolts and oil cooler tube from the vehicle body.

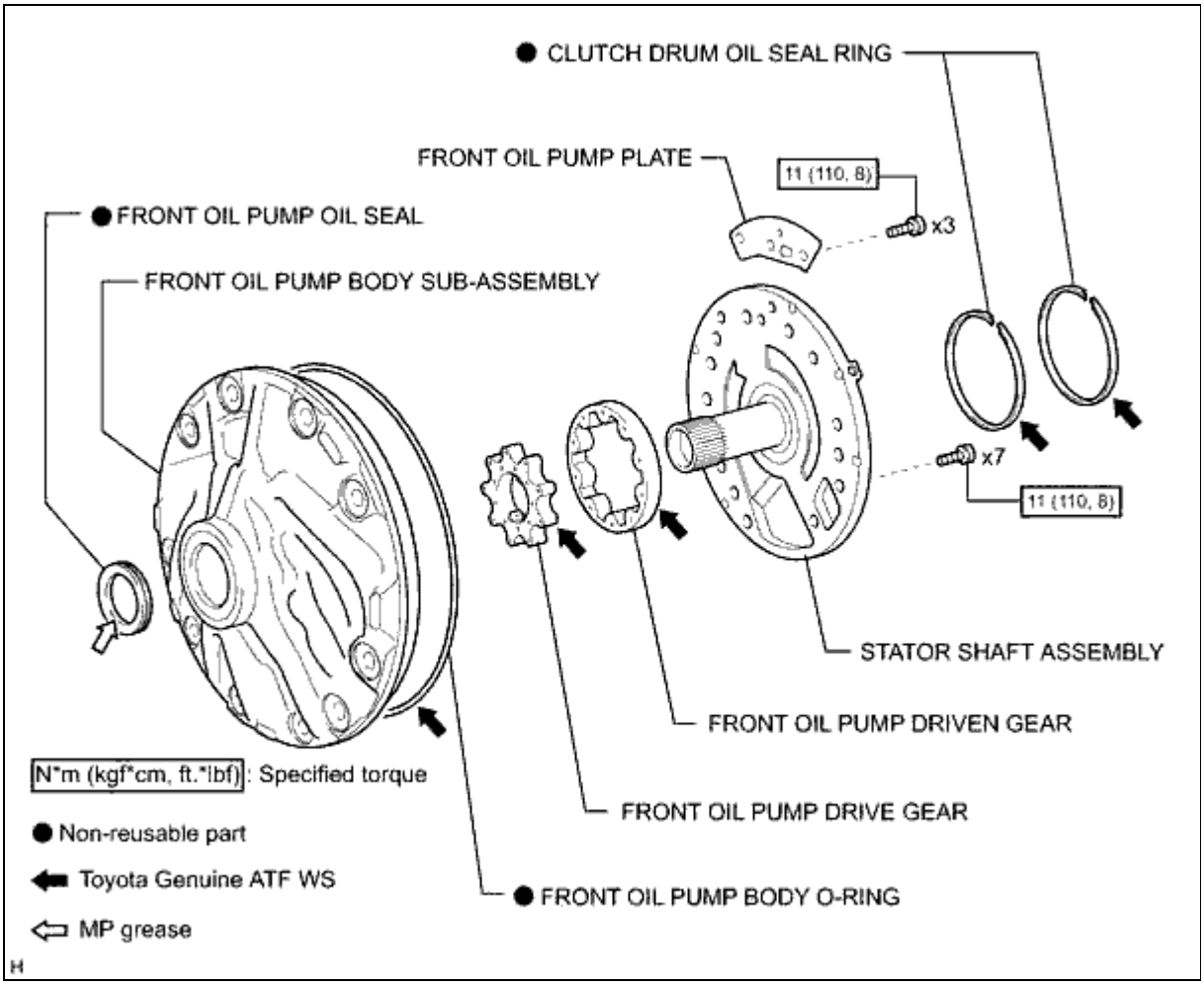


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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL PUMP: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



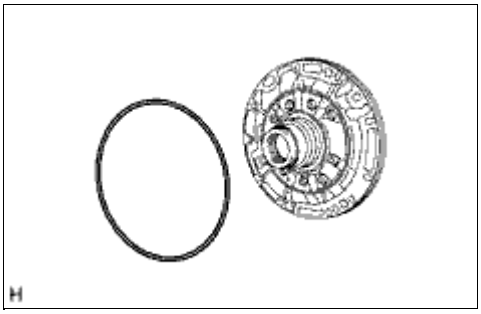
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA603JX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL PUMP: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

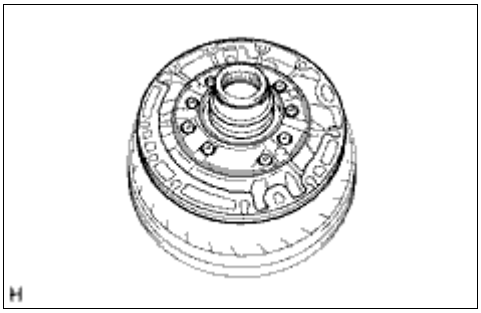
1. REMOVE FRONT OIL PUMP BODY O-RING

(a) Remove the front oil pump body O-ring from the oil pump assembly.



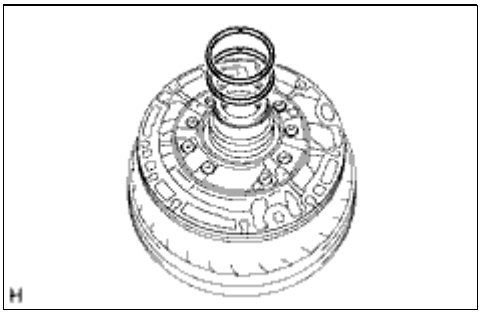
2. SECURE OIL PUMP ASSEMBLY

(a) Place the oil pump assembly on the torque converter assembly.



3. REMOVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 2 clutch drum oil seal rings from the oil pump assembly.

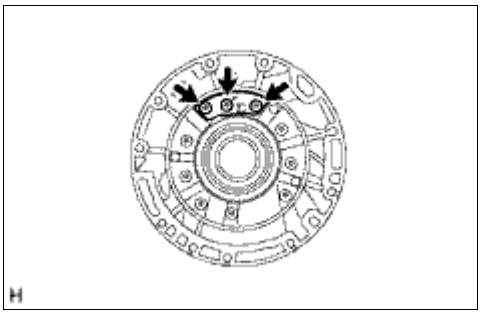


4. INSPECT FRONT OIL PUMP DRIVE GEAR ROTATION INFO

5. REMOVE FRONT OIL PUMP PLATE

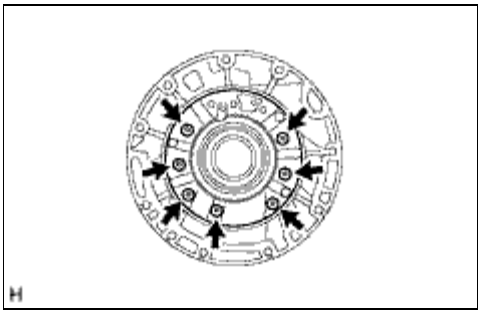
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(a) Using a T30 "TORX" socket wrench, remove the 3 screws and front oil pump plate from the oil pump assembly.



6. REMOVE STATOR SHAFT ASSEMBLY

(a) Using a T30 "TORX" socket wrench, remove the 7 screws and stator shaft assembly from the front oil pump body sub-assembly.

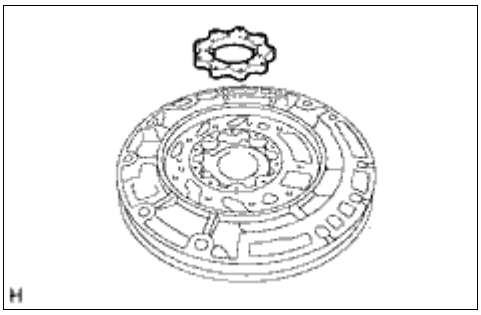


7. INSPECT STATOR SHAFT ASSEMBLY INFO

8. INSPECT CLEARANCE OF OIL PUMP ASSEMBLY INFO

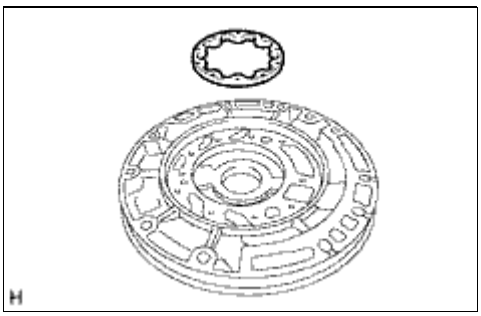
9. REMOVE FRONT OIL PUMP DRIVE GEAR

(a) Remove the front oil pump drive gear from the front oil pump body sub-assembly.



10. REMOVE FRONT OIL PUMP DRIVEN GEAR

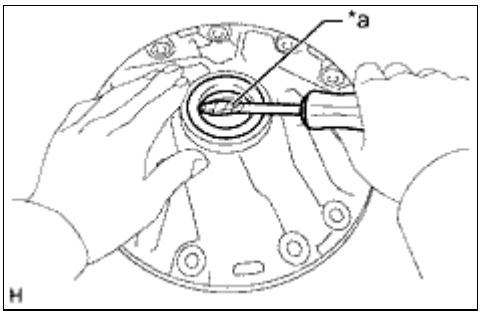
(a) Remove the front oil pump driven gear from the front oil pump body sub-assembly.



11. REMOVE FRONT OIL PUMP OIL SEAL

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(a) Using a screwdriver, remove the front oil pump oil seal from the front oil pump body sub-assembly.



Text in Illustration

*a	Protective Tape

NOTICE:

Do not damage the bushing or front oil pump body sub-assembly.

HINT:

Tape the screwdriver tip before use.

12. INSPECT FRONT OIL PUMP BODY SUB-ASSEMBLY INFO

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Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL PUMP: INSPECTION; 2016 MY Tacoma [08/2015 -]		

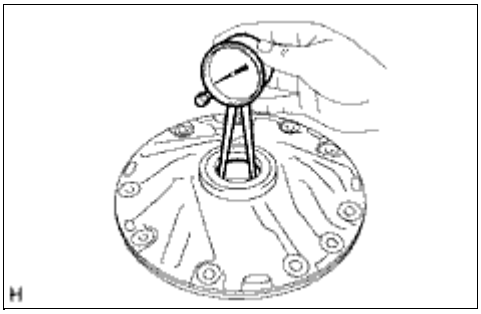
INSPECTION

1. INSPECT FRONT OIL PUMP BODY SUB-ASSEMBLY

(a) Using a dial indicator, measure the inside diameter of the front oil pump body sub-assembly bushing.

Maximum inside diameter:
38.138 mm (1.50 in.)

If the inside diameter is more than the maximum inside diameter, replace the front oil pump body sub-assembly.

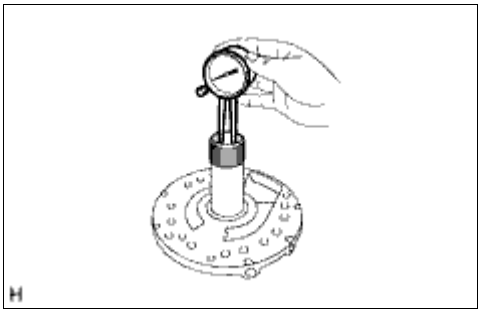


2. INSPECT STATOR SHAFT ASSEMBLY

(a) Using a dial indicator, measure the inside diameter of the stator shaft assembly bushing.

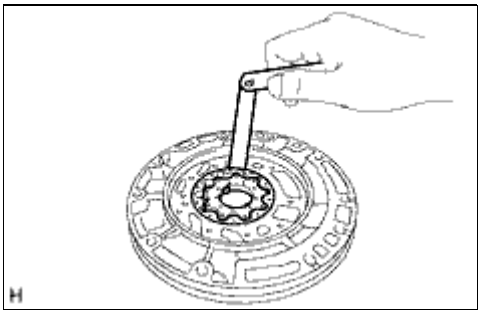
Maximum inside diameter:
22.227 mm (0.875 in.)

If the inside diameter is more than the maximum inside diameter, replace the stator shaft assembly.



3. INSPECT CLEARANCE OF OIL PUMP ASSEMBLY

(a) Push the front oil pump driven gear to one side of the front oil pump body sub-assembly.



(b) Using a feeler gauge, measure the clearance.

Standard body clearance:
0.10 to 0.17 mm (0.00394 to 0.00669 in.)

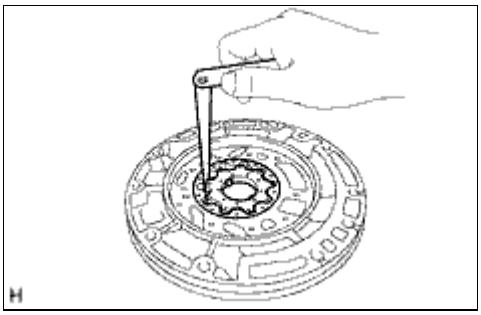
If the body clearance is more than the standard clearance, check the front oil pump drive gear, front oil pump driven gear and front oil pump body sub-assembly.

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(c) Using a feeler gauge, measure the clearance between the front oil pump driven gear teeth and the front oil pump drive gear teeth.

Standard tip clearance:
0.07 to 0.15 mm (0.00276 to 0.00590 in.)

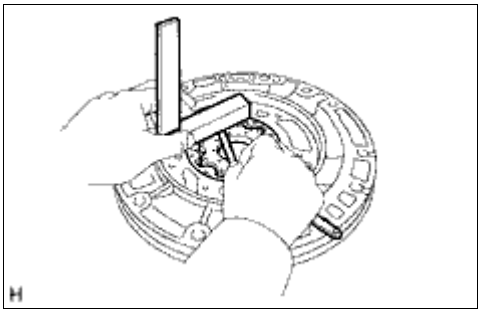
If the tip clearance is more than the standard clearance, check the front oil pump drive gear, front oil pump driven gear and front oil pump body sub-assembly.



(d) Using a steel straightedge and a feeler gauge, measure the side clearance of both gears.

Standard side clearance:
0.03 to 0.05 mm (0.00118 to 0.00196 in.)

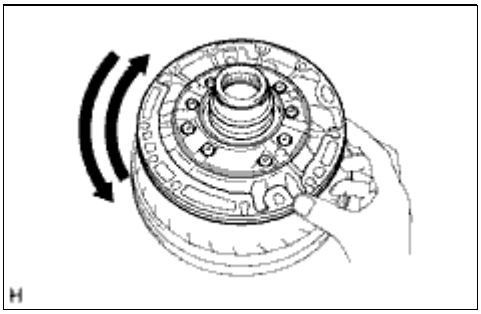
If the side clearance is more than the standard thickness, check the front oil pump drive gear, front oil pump driven gear and front oil pump body sub-assembly.



4. INSPECT OIL PUMP DRIVE GEAR ROTATION

(a) Install the oil pump assembly to the torque converter assembly.

(b) Check that the front oil pump drive gear rotates smoothly.



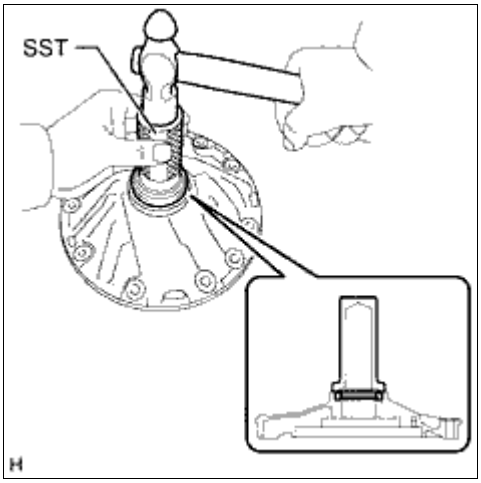
(c) Remove the oil pump assembly from the torque converter assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OA703JX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: OIL PUMP: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. INSTALL FRONT OIL PUMP OIL SEAL



(a) Using SST and a hammer, install a new front oil pump oil seal to the front oil pump body sub-assembly.

SST: 09350-30020

09351-32140

Standard depth:

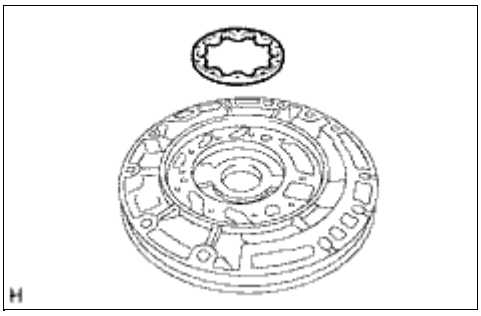
-0.3 to 0.3 mm (-0.0118 to 0.0118 in.)

(b) Coat the lip of the front oil pump oil seal with MP grease.

2. SECURE FRONT OIL PUMP BODY SUB-ASSEMBLY

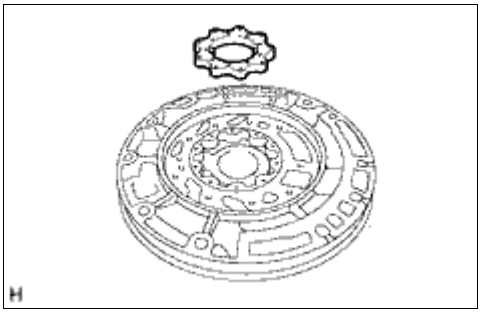
(a) Place the front oil pump body sub-assembly on the torque converter assembly.

3. INSTALL FRONT OIL PUMP DRIVEN GEAR



(a) Coat the front oil pump driven gear with ATF and install it to the front oil pump body sub-assembly.

4. INSTALL FRONT OIL PUMP DRIVE GEAR

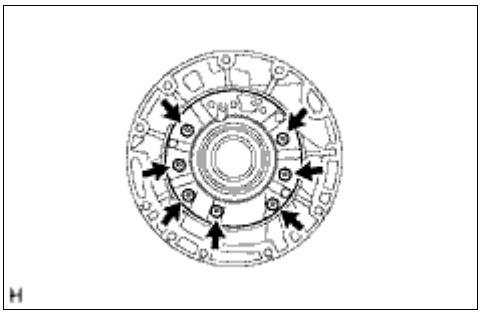


(a) Coat the front oil pump drive gear with ATF and install it to the front oil pump body sub-assembly.

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5. INSTALL STATOR SHAFT ASSEMBLY

(a) Align the bolt holes of the stator shaft assembly with the bolt holes of the front oil pump body sub-assembly and install the stator shaft assembly to the front oil pump body sub-assembly.



(b) Using a T30 "TORX" socket wrench, install the 7 screws.

Torque:

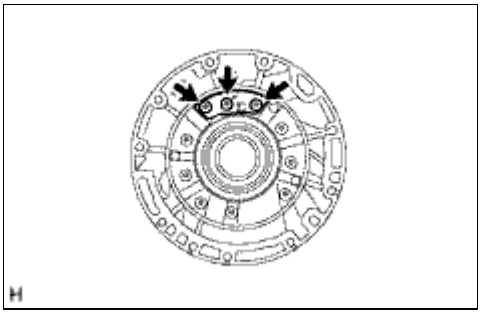
11 N·m {110 kgf·cm, 8ft·lbf}

6. INSTALL FRONT OIL PUMP PLATE

(a) Using a T30 "TORX" socket wrench, install the front oil pump plate with the 3 screws.

Torque:

11 N·m {110 kgf·cm, 8ft·lbf}



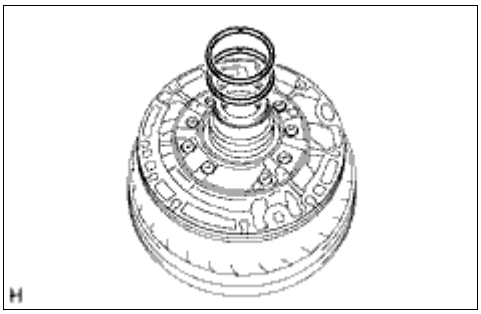
7. INSPECT OIL PUMP DRIVE GEAR ROTATION INFO

8. INSTALL CLUTCH DRUM OIL SEAL RING

(a) Coat 2 new clutch drum oil seal rings with ATF and install them to the oil pump assembly

NOTICE:

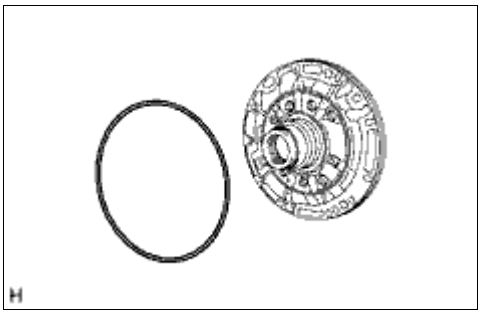
- Do not expand the gap of the clutch drum oil seal rings excessively.
- After installing the clutch drum oil seal rings, check that they rotate smoothly.



9. INSTALL FRONT OIL PUMP BODY O-RING

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(a) Coat a new front oil pump body O-ring with ATF and install it to the oil pump assembly.



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Last Modified: 11-13-2015	6.6 N	**Doc ID:** RM000000O5M01KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: ADJUSTMENT; 2016 MY Tacoma [08/2015 -]		

ADJUSTMENT

1. ADJUST PARK/NEUTRAL POSITION SWITCH

(a) While pushing the shift lock release button, move the shift lever to N.

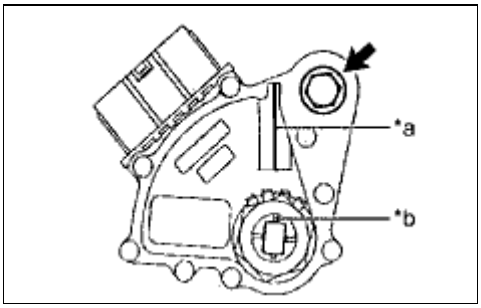
(b) Remove the bolt of the park/neutral position switch.

(c) Clean the bolt and bolt hole.

(d) Apply adhesive to 2 or 3 threads on the end of the bolt.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(e) Align the neutral basic line with the groove as shown in the illustration.



Text in Illustration

*a	Neutral Basic Line
*b	Groove

(f) Hold the park/neutral position switch in position and install the bolt.

Torque:
13 N·m {130 kgf·cm, 9ft·lbf}

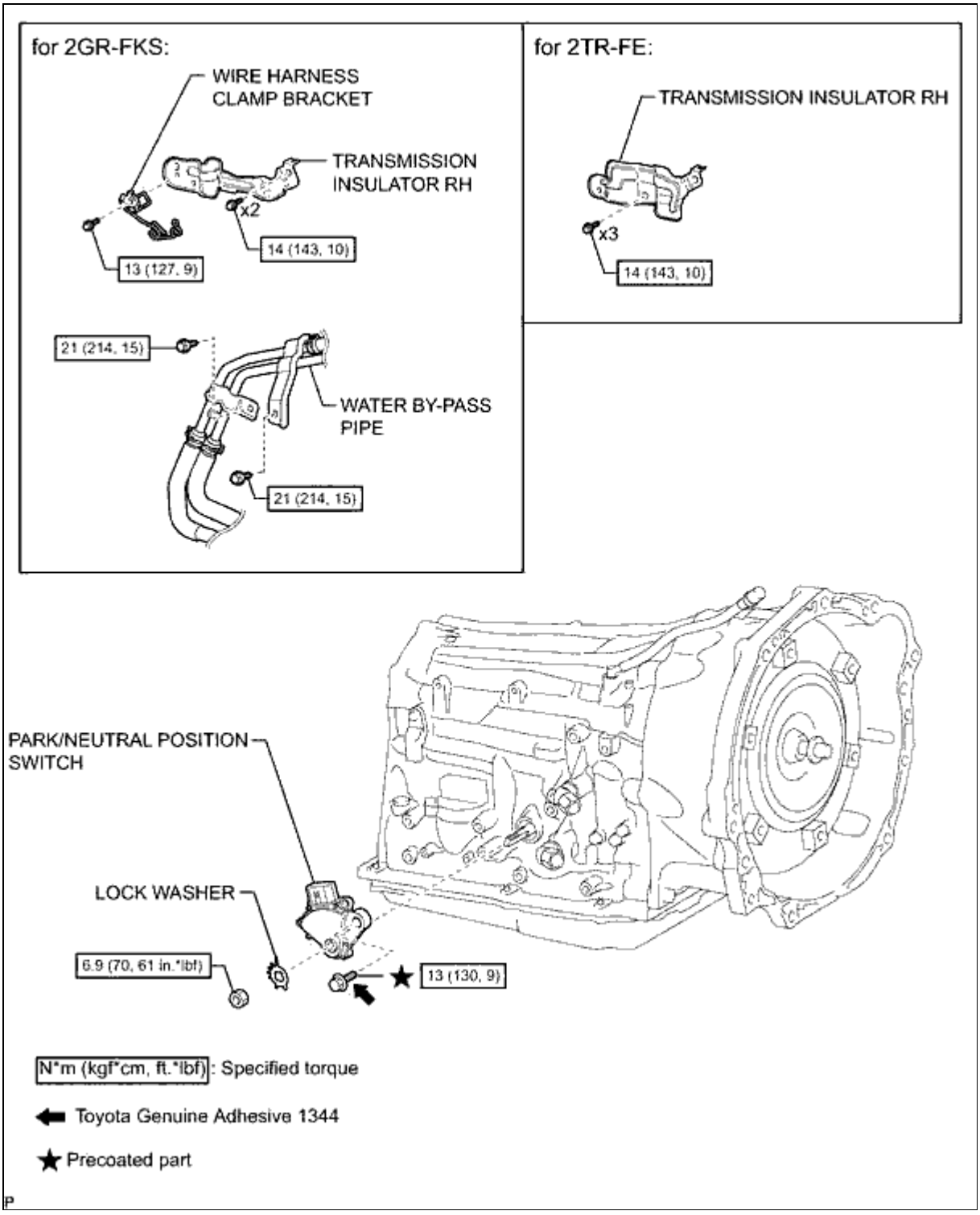
(g) After the adjustment, perform the park/neutral position switch operation check INFO .

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9R01DX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000OD401LX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT PARK/NEUTRAL POSITION SWITCH

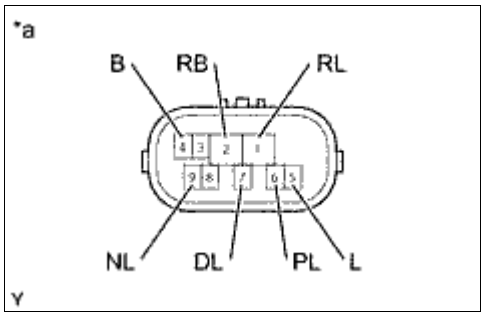
(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Park/Neutral Position Switch)

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (B) - 5 (L)	Shift lever in P or N	Below 1 Ω
2 (RB) - 6 (PL)	Shift lever in P	Below 1 Ω
2 (RB) - 1 (RL)	Shift lever in R	Below 1 Ω
2 (RB) - 9 (NL)	Shift lever in N	Below 1 Ω
2 (RB) - 7 (DL)	Shift lever in D, S, "+" or "-"	Below 1 Ω
4 (B) - 5 (L)	Shift lever not in P or N	10 kΩ or higher
2 (RB) - 6 (PL)	Shift lever not in P	10 kΩ or higher
2 (RB) - 1 (RL)	Shift lever not in R	10 kΩ or higher
2 (RB) - 9 (NL)	Shift lever not in N	10 kΩ or higher
2 (RB) - 7 (DL)	Shift lever not in D, S, "+" or "-"	10 kΩ or higher



If the resistance value is not as specified, replace the park/neutral position switch.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O5N01SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL PARK/NEUTRAL POSITION SWITCH

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

(a) Clean the bolt and bolt hole.

(b) Apply adhesive to 2 or 3 threads on the end of the bolt.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(c) Temporarily install the park/neutral position switch to the automatic transmission assembly with the bolt.

HINT:

Tighten the bolt to the specified torque when adjusting the park/neutral position switch.

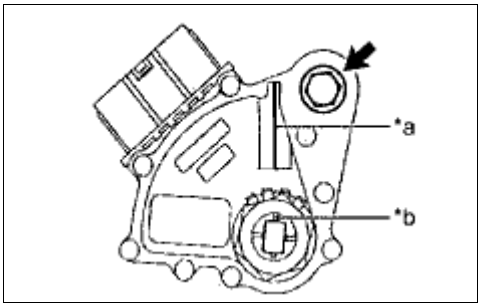
(d) Install a new lock washer and nut to the park/neutral position switch.

Torque:

6.9 N·m {70 kgf·cm, 61in·lbf}

(e) Move the shift lever to N.

(f) Align the neutral basic line with the groove as shown in the illustration, and tighten the bolt.



Text in Illustration

*a	Neutral Basic Line
*b	Groove

Torque:

13 N·m {130 kgf·cm, 9ft·lbf}

(g) Using a screwdriver, bend the tabs of the lock washer.

NOTICE:

- Be careful not to damage the park/neutral position switch.
- Bend at least 2 of the lock washer tabs.

HINT:

Tape the screwdriver tip before use.

(h) Connect the park/neutral position switch connector.

2. INSTALL WATER BY-PASS PIPE (for 2GR-FKS)

(a) Install the water by-pass pipe to the automatic transmission assembly with the 2 bolts.

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Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

3. INSTALL TRANSMISSION INSULATOR RH (for 2GR-FKS) INFO

4. INSTALL TRANSMISSION INSULATOR RH (for 2TR-FE) INFO

5. INSPECT PARK/NEUTRAL POSITION SWITCH INFO

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000OD501MX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: ON-VEHICLE INSPECTION; 2016 MY Tacoma [08/2015 -]		

ON-VEHICLE INSPECTION

1. INSPECT PARK/NEUTRAL POSITION SWITCH

(a) Apply the parking brake.

(b) Turn the ignition switch to ON.

(c) Depress the brake pedal and move the shift lever to any position other than P.

(d) Depress the brake pedal and check that the engine starts when the shift lever is in N or P, but does not start in other positions.

(e) Check that the back-up light comes on and the reverse warning buzzer sounds when the shift lever is in R, but the light and buzzer do not operate in other positions.

If a failure is found, check the park/neutral position switch for continuity.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O5O01QX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PARK / NEUTRAL POSITION SWITCH: REMOVAL; 2016 MY Tacoma [08/2015 -]		

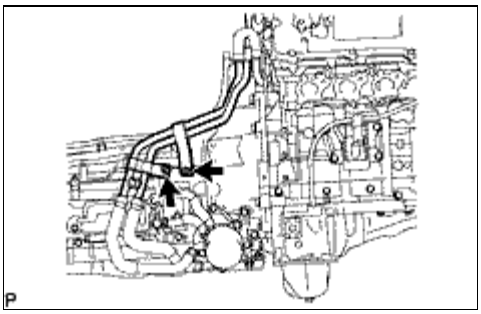
REMOVAL

1. REMOVE TRANSMISSION INSULATOR RH (for 2GR-FKS) INFO

2. REMOVE TRANSMISSION INSULATOR RH (for 2TR-FE) INFO

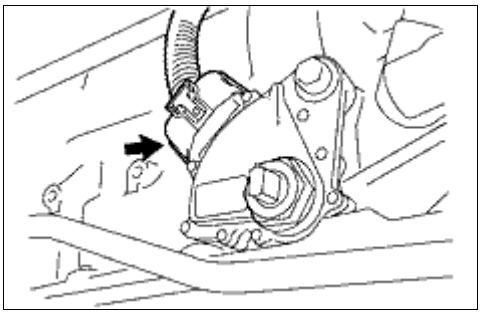
3. SEPARATE WATER BY-PASS PIPE (for 2GR-FKS)

(a) Remove the 2 bolts to separate the water by-pass pipe from the automatic transmission assembly.

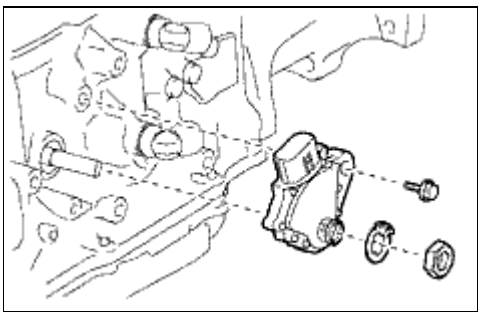


4. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Disconnect the park/neutral position switch connector.



(b) Using a screwdriver, pry out the lock washer.



(c) Remove the nut and lock washer.

(d) Remove the bolt and park/neutral position switch from the automatic transmission assembly.

HINT:

Make sure that the manual valve lever shaft has not been rotated prior to installing the park/neutral position switch as the detent spring may become detached from the manual valve lever shaft.

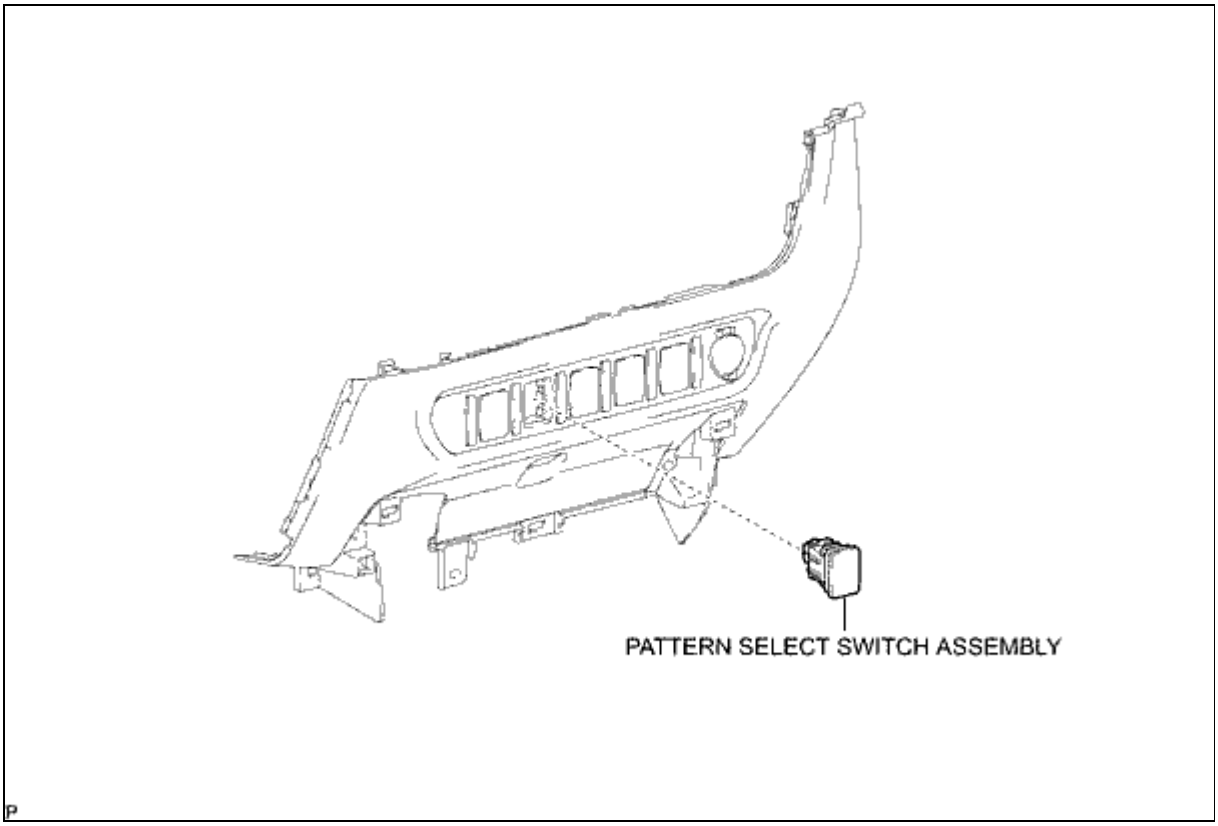
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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005VOZ000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000005VOY000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: INSPECTION; 2016 MY Tacoma [08/2015 -]		

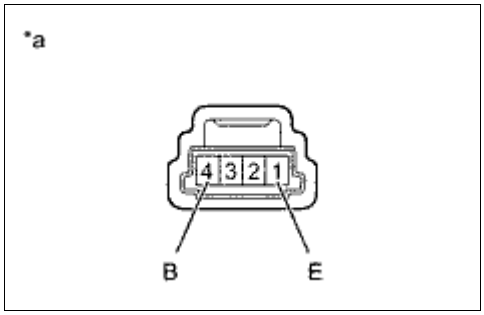
INSPECTION

1. INSPECT PATTERN SELECT SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Pattern Select Switch Assembly)



Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
4 (B) - 1 (E)	Pattern select switch pushed	Below 1 Ω
	Pattern select switch not pushed	10 kΩ or higher

If the result is not as specified, replace the pattern select switch assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000005VOX000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL PATTERN SELECT SWITCH ASSEMBLY

(a) Attach the 2 claws to install the pattern select switch assembly to the instrument panel lower center finish panel.

2. INSTALL INSTRUMENT PANEL LOWER CENTER FINISH PANEL

INFO

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000005VP0000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: PATTERN SELECT SWITCH: REMOVAL; 2016 MY Tacoma [08/2015 -]		

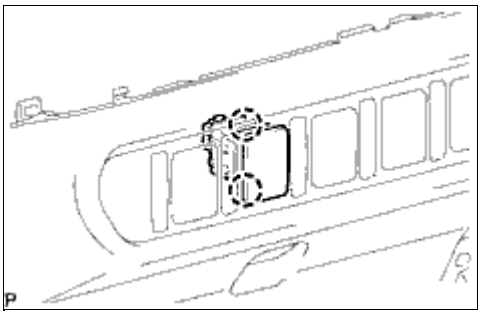
REMOVAL

1. REMOVE INSTRUMENT PANEL LOWER CENTER FINISH PANEL

INFO

2. REMOVE PATTERN SELECT SWITCH ASSEMBLY

(a) Detach the 2 claws to remove the pattern select switch assembly from the instrument panel lower center finish panel.

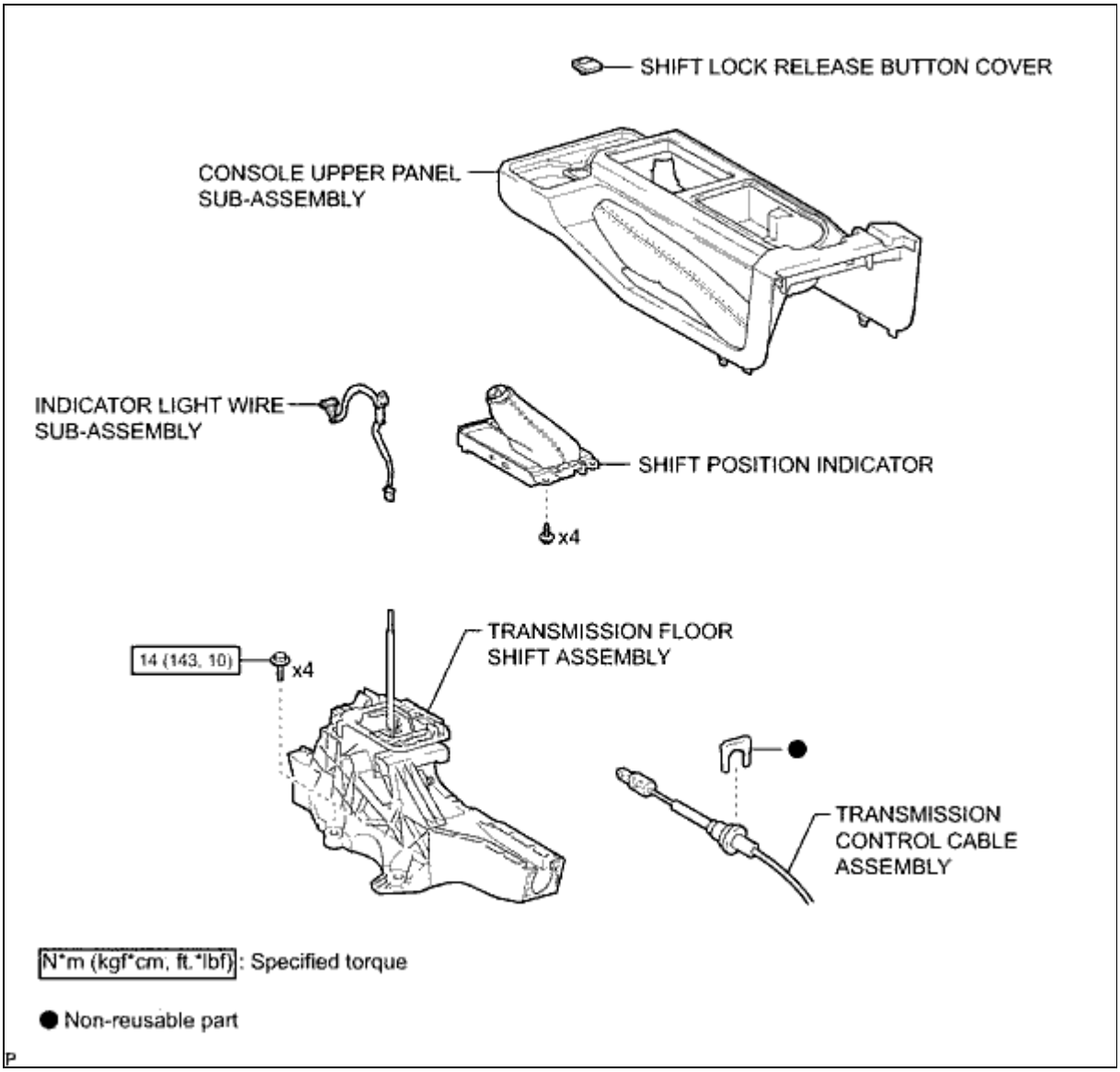


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005NPA005X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SHIFT LEVER: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



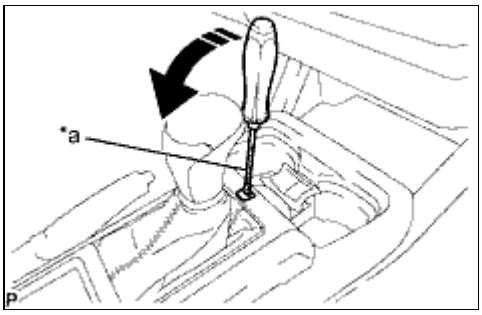
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NR03FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SHIFT LEVER: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. REMOVE SHIFT LOCK RELEASE BUTTON COVER

(a) Using a screwdriver with its tip wrapped in protective tape, detach the 2 claws to remove the shift lock release button cover from the console upper panel sub-assembly.

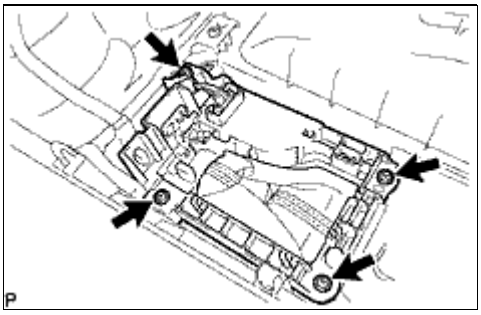


Text in Illustration

*a	Protective Tape
➡	Remove in this Direction

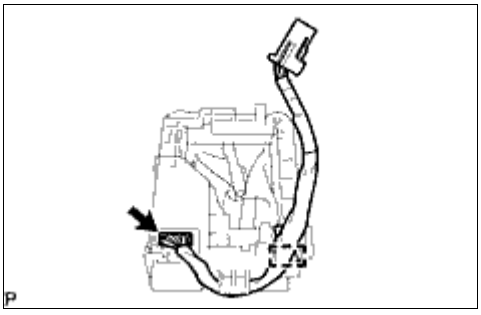
2. REMOVE SHIFT POSITION INDICATOR

(a) Remove the 4 screws and shift position indicator from the console upper panel sub-assembly.



3. REMOVE INDICATOR LIGHT WIRE SUB-ASSEMBLY

(a) Detach the clamp to separate the indicator light wire sub-assembly from the shift position indicator.



(b) Disconnect the connector to remove the indicator light wire sub-assembly from the shift position indicator.

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000004S3800WX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SHIFT LEVER: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TRANSMISSION FLOOR SHIFT ASSEMBLY (w/o Smart Key System)

HINT:

If the results of the following inspections are as specified but a malfunction has occurred, replace the transmission floor shift assembly.

(a) Inspect the wire harness.

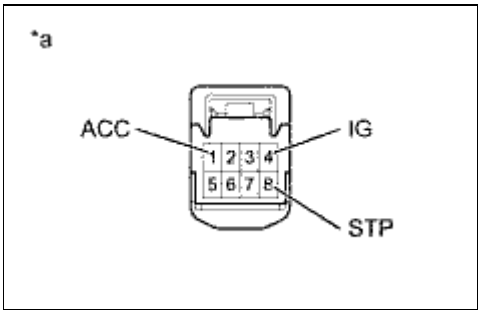
(1) Disconnect the shift lock control ECU connector.

(2) Measure the voltage according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))

Standard Voltage:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (ACC) - Body ground	Ignition switch ACC	11 to 14 V
	Ignition switch off	Below 1 V
4 (IG) - Body ground	Ignition switch ON	11 to 14 V
	Ignition switch off	Below 1 V
8 (STP) - Body ground	Brake pedal depressed	11 to 14 V
	Brake pedal released	Below 1 V

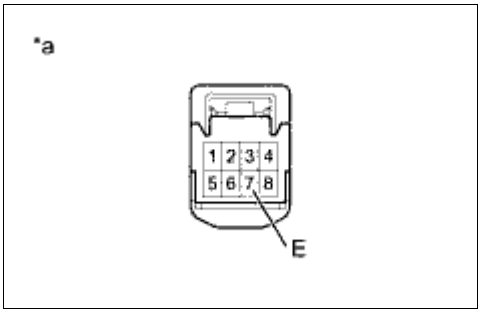
If the result is not as specified, repair or replace the wire harness or connector.

(3) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))

Standard Resistance:



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TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
7 (E) - Body ground	Always	Below 1 Ω

If the result is not as specified, repair or replace the wire harness or connector.

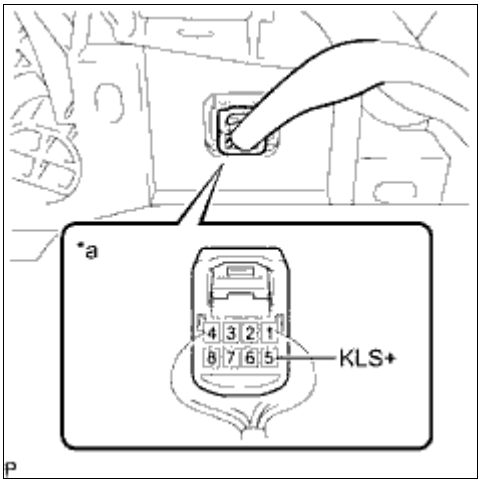
(b) Inspect the key interlock solenoid operation signal.

(1) Connect the shift lock control ECU connector.

(2) Measure the voltage according to the value(s) in the table below.

Text in Illustration

*a	Component with harness connected (Shift Lock Control ECU (Transmission Floor Shift Assembly))



Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (KLS+) - Body ground	Ignition switch ACC and shift lever in P	Below 1 V
	Ignition switch ACC and shift lever not in P	11 to 14 V

HINT:

Do not disconnect the shift lock control ECU connector.

If the result is not as specified, replace the transmission floor shift assembly.

If the shift lock does not operate when the power source of the shift lock control ECU is normal and the resistance between the body ground and the shift lock control ECU is as specified, replace the transmission floor shift assembly.

2. INSPECT TRANSMISSION FLOOR SHIFT ASSEMBLY (w/ Smart Key System)

HINT:

If the results of the following inspections are as specified but a malfunction has occurred, replace the transmission floor shift assembly.

(a) Inspect the wire harness.

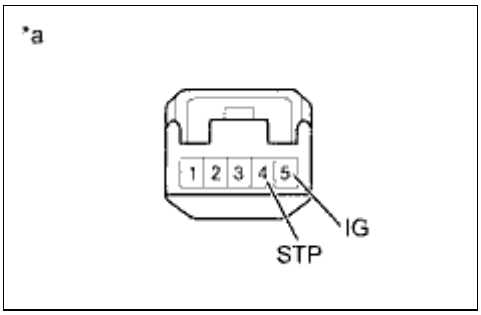
(1) Disconnect the shift lock control ECU connector.

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(2) Measure the voltage according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))



Standard Voltage:

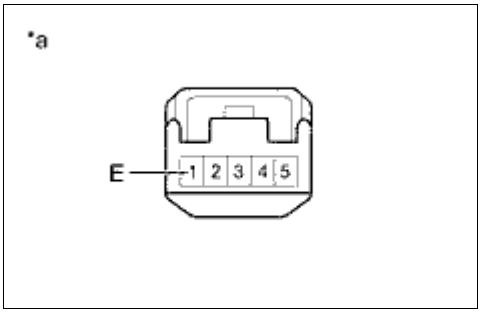
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
5 (IG) - Body ground	Engine switch on (IG)	11 to 14 V
	Engine switch off	Below 1 V
4 (STP) - Body ground	Brake pedal depressed	11 to 14 V
	Brake pedal released	Below 1 V

If the result is not as specified, repair or replace the wire harness or connector.

(3) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Front view of wire harness connector (to Shift Lock Control ECU (Transmission Floor Shift Assembly))



Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (E) - Body ground	Always	Below 1 Ω

If the result is not as specified, repair or replace the wire harness or connector.

If the shift lock does not operate when the power source of the shift lock control ECU is normal and the resistance between the body ground and the shift lock control ECU is as specified, replace the transmission floor shift assembly.

3. INSPECT TRANSMISSION CONTROL SWITCH (TRANSMISSION FLOOR SHIFT ASSEMBLY)

(a) Disconnect the transmission control switch connector.

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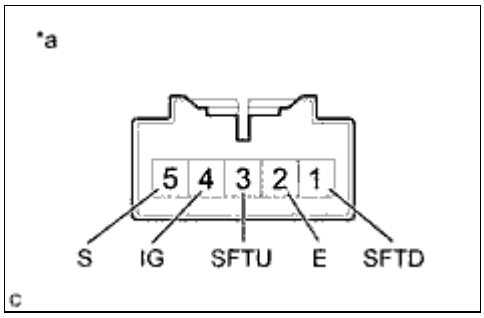
(b) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Transmission Control Switch (Transmission Floor Shift Assembly))

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
4 (IG) - 5 (S)	Shift lever in S, "+" or "- "	Below 1 Ω
	Shift lever not in S, "+" or "- "	10 kΩ or higher
3 (SFTU) - 2 (E)	Shift lever held in "+" (Up-shift)	Below 1 Ω
	Shift lever not held in "+"	10 kΩ or higher
1 (SFTD) - 2 (E)	Shift lever held in "- " (Down-shift)	Below 1 Ω
	Shift lever not held in "-"	10 kΩ or higher



If the result is not as specified, replace the transmission floor shift assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NO04BX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SHIFT LEVER: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION FLOOR SHIFT ASSEMBLY

(a) Install the transmission floor shift assembly to the vehicle body with the 4 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Attach the 4 clamps to connect the wire harness to the transmission floor shift assembly.

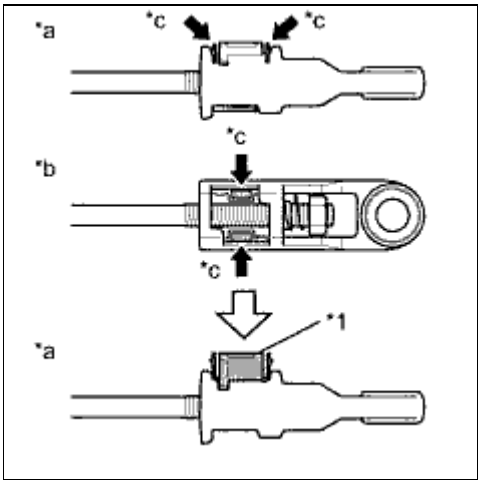
(c) Connect the 2 connectors to the transmission floor shift assembly.

2. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

NOTICE:

Check that the park/neutral position switch and the shift lever are in N.

(a) Push the 2 claws together at the top of the transmission control cable lock piece. While holding the 2 claws together, push the 2 lugs on the bottom of the lock piece toward each other and upward to pull out the lock piece.

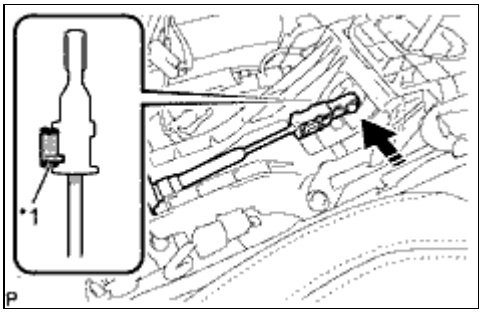


Text in Illustration

*1	Lock Piece
*a	Side View
*b	Bottom View
*c	Push

(b) Connect the transmission control cable assembly to the transmission floor shift assembly, and install a new clip.

(c) Connect the end of the transmission control cable assembly to the transmission floor shift assembly.



Text in Illustration

*1	Lock Piece

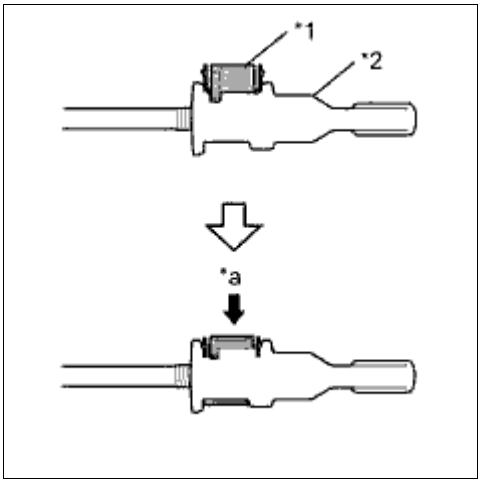
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➡	Connect in this Direction

NOTICE:

- The shift lever should be in N.
- Make sure that the lock piece is pulled up.
- Push on the end of the cable all the way to the base of the transmission floor shift assembly pin.

(d) Push the lock piece into the adjuster case.



Text in Illustration

*1	Lock Piece
*2	Adjuster Case
*a	Push

NOTICE:

Securely push in the lock piece until it locks.

3. INSPECT SHIFT LEVER POSITION INFO

4. INSTALL FRONT CONSOLE BOX

INFO

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000002M9A08SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SHIFT LEVER: ON-VEHICLE INSPECTION; 2016 MY Tacoma [08/2015 -]		

ON-VEHICLE INSPECTION

1. INSPECT SHIFT LEVER POSITION

(a) When moving the shift lever from P to each position with the ignition switch ON and the brake pedal depressed, check that the shift lever moves smoothly and correctly into position.

(b) Start the engine and check that the vehicle moves forward when the shift lever is moved from N to D and moves rearward when the shift lever is moved to R.

If the operation is not as specified, inspect the park/neutral position switch and transmission floor shift assembly.

2. INSPECT SHIFT LOCK OPERATION

(a) Move the shift lever to P.

(b) Turn the ignition switch off.

(c) Check that the shift lever cannot be moved from P to any other position.

(d) Turn the ignition switch to ON, depress the brake pedal, and check that the shift lever can be moved to other position.

If the operation is not as specified, inspect the transmission floor shift assembly.

3. INSPECT SHIFT LOCK RELEASE BUTTON OPERATION

(a) Move the shift lever to P.

(b) Turn the ignition switch off.

(c) Remove the shift lock release button cover.

(d) When moving the shift lever with the shift lock release button pressed, check that the shift lever can be moved from P to any other position.

If the operation is not as specified, inspect the transmission floor shift assembly.

(e) Install the shift lock release button cover.

4. INSPECT KEY INTERLOCK OPERATION (w/o Smart Key System)

(a) Turn the ignition switch to ON.

(b) Depress the brake pedal and move the shift lever to any position other than P.

(c) Check that the ignition key cannot be turned to LOCK.

(d) Move the shift lever to P, turn the ignition key to LOCK and check that the ignition key can be removed.

If the operation is not as specified, inspect the transmission floor shift assembly.

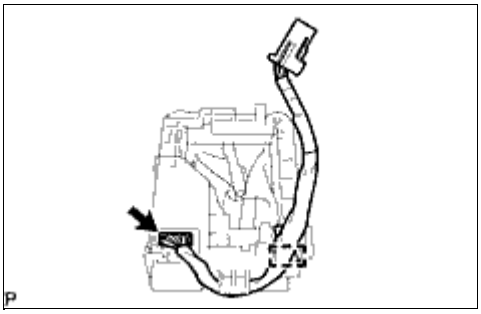
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NS03FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SHIFT LEVER: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. INSTALL INDICATOR LIGHT WIRE SUB-ASSEMBLY

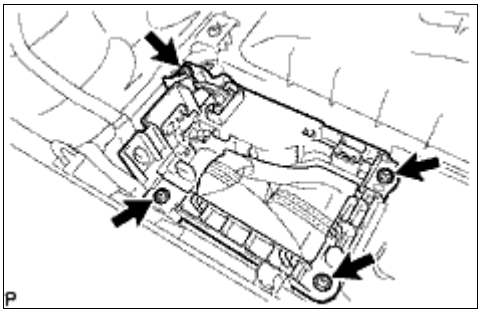
(a) Connect the connector to install the indicator light wire sub-assembly to the shift position indicator.



(b) Attach the clamp to install the indicator light wire sub-assembly to the shift position indicator.

2. INSTALL SHIFT POSITION INDICATOR

(a) Install the shift position indicator to the console upper panel sub-assembly with the 4 screws.



3. INSTALL SHIFT LOCK RELEASE BUTTON COVER

(a) Attach the 2 claws to install the shift lock release button cover to the console upper panel sub-assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000010NQ039X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SHIFT LEVER: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

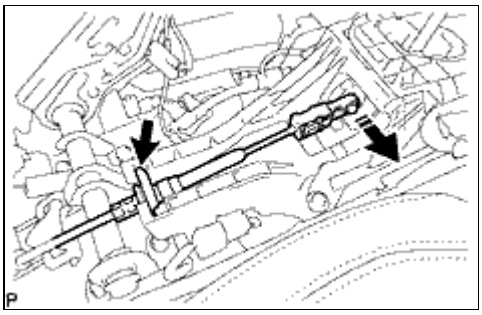
1. REMOVE FRONT CONSOLE BOX

INFO

2. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Move the shift lever to N.

(b) Disconnect the end of the transmission control cable assembly from the transmission floor shift assembly.



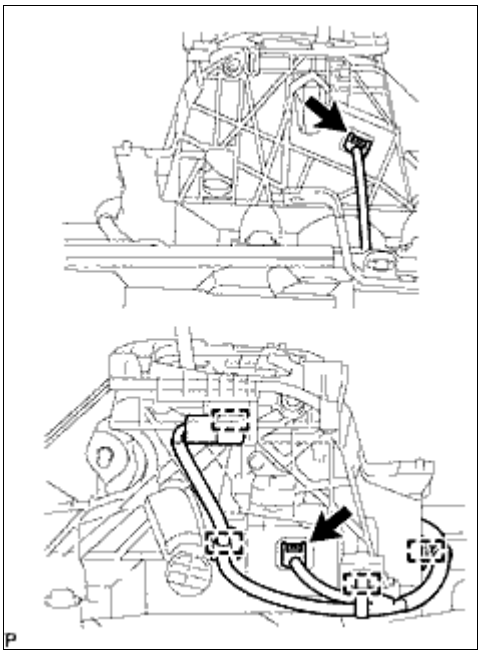
Text in Illustration

➡	Disconnect in this Direction

(c) Remove the clip to disconnect the transmission control cable assembly from the transmission floor shift assembly.

3. REMOVE TRANSMISSION FLOOR SHIFT ASSEMBLY

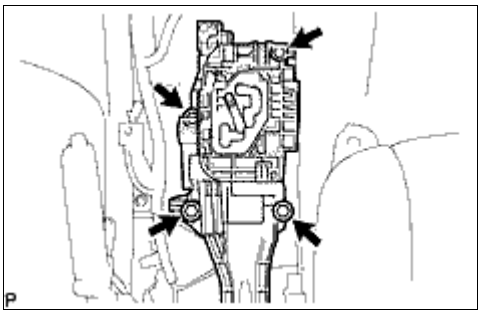
(a) Disconnect the 2 connectors from the transmission floor shift assembly.



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(b) Detach the 4 clamps to disconnect the wire harness from the transmission floor shift assembly.

(c) Remove the 4 bolts and transmission floor shift assembly from the vehicle body.

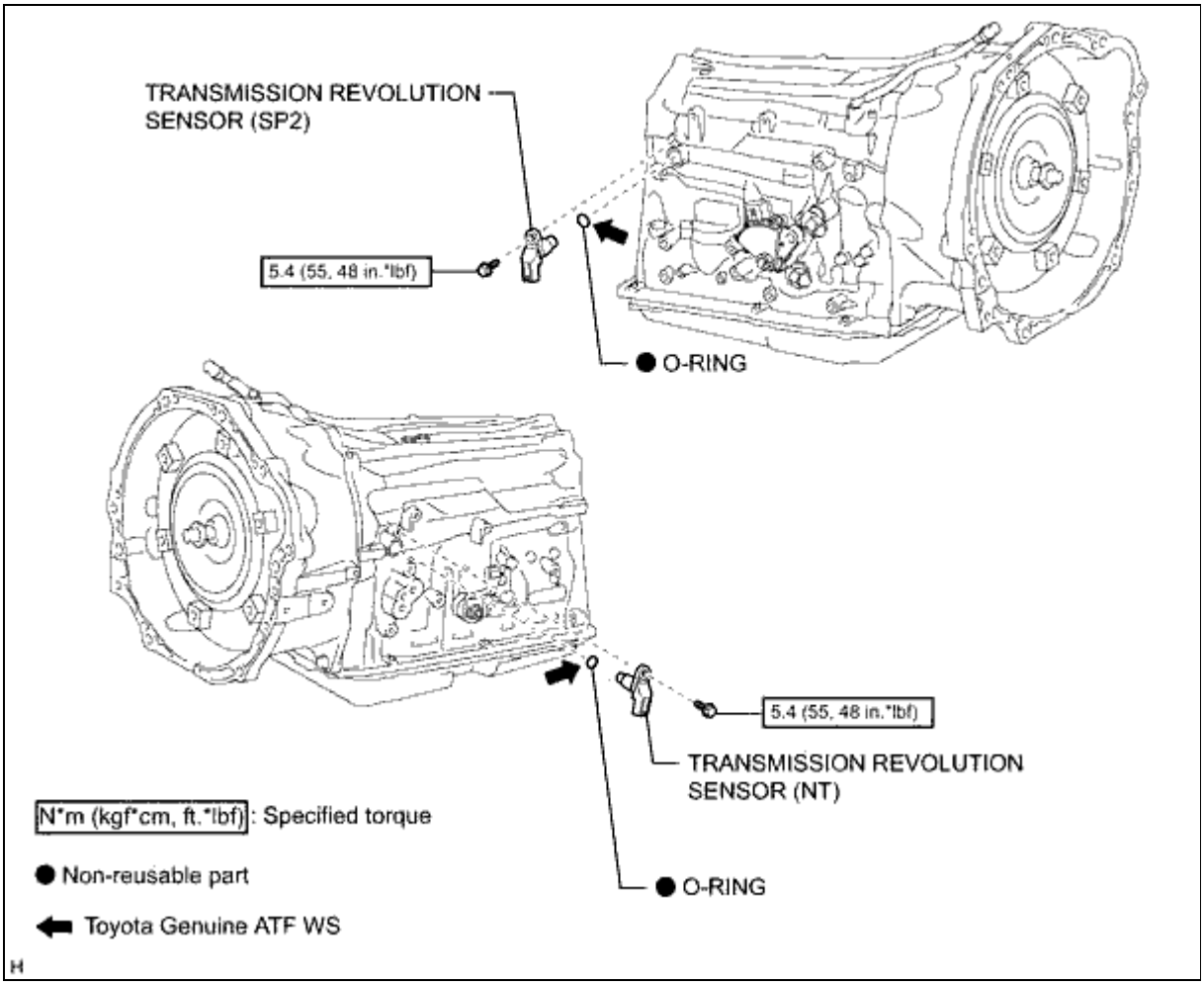


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9T04BX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SPEED SENSOR: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



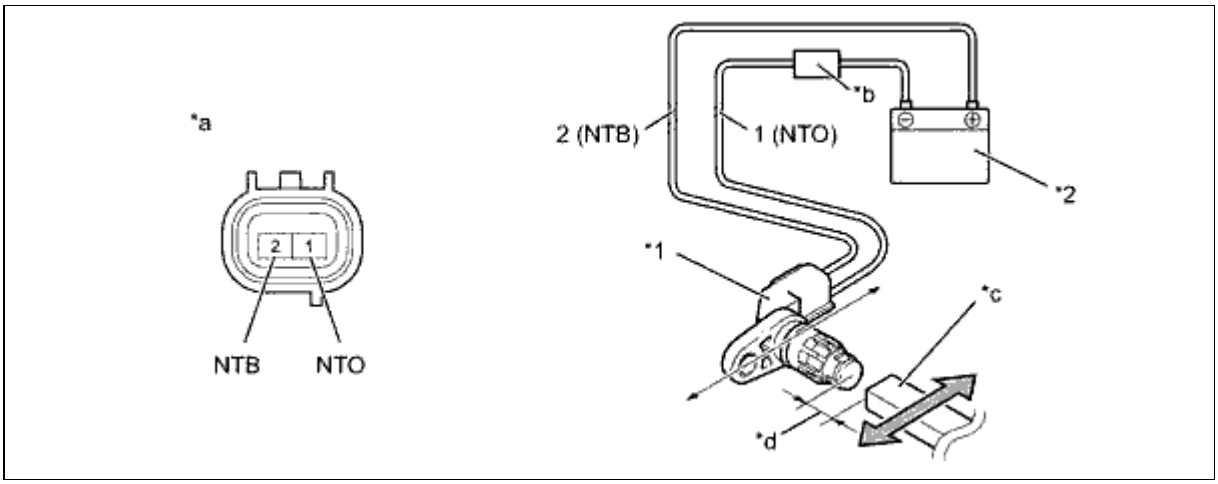
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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000UKF04YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SPEED SENSOR: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TRANSMISSION REVOLUTION SENSOR (NT)

(a) Connect the battery to the transmission revolution sensor (NT) as shown in the illustration.



Text in Illustration

*1	Transmission Revolution Sensor (NT)	*2	Battery
*a	Component without harness connected (Transmission Revolution Sensor (NT))	*b	Ammeter
*c	Magnet	*d	5 mm (0.197 in.) or less

(b) Wave a magnetic object left and right in front of the transmission revolution sensor (NT) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(c) Measure the current according to the value(s) in the table below.

Standard Current:

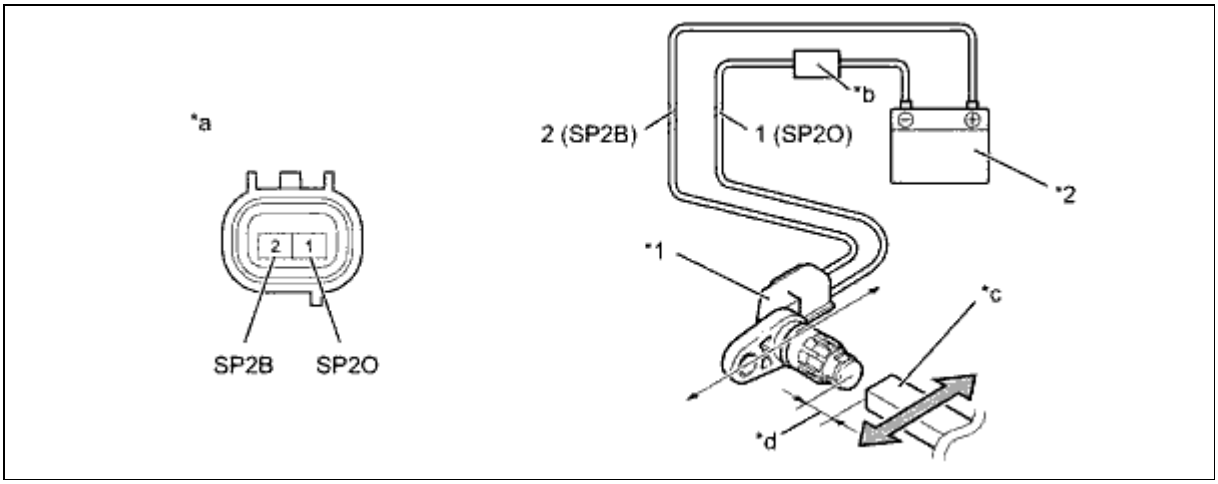
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (NTO) - 2 (NTB)	Low signal	4 to 8 mA
	High signal	12 to 16 mA

If the result is not as specified, replace the transmission revolution sensor (NT).

2. INSPECT TRANSMISSION REVOLUTION SENSOR (SP2)

(a) Connect the battery to the transmission revolution sensor (SP2) as shown in the illustration.

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Text in Illustration

*1	Transmission Revolution Sensor (SP2)	*2	Battery
*a	Component without harness connected (Transmission Revolution Sensor (SP2))	*b	Ammeter
*c	Magnet	*d	5 mm (0.197 in.) or less

(b) Wave a magnetic object left and right in front of the transmission revolution sensor (SP2) tip (5 mm (0.197 in.) or less) to change the high/low signals while measuring the current.

NOTICE:

Make sure to wave the magnetic object during the inspection. The current will not change without waving the magnetic object as indicated by the arrow in the illustration.

(c) Measure the current according to the value(s) in the table below.

Standard Current:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 (SP2O) - 2 (SP2B)	Low signal	4 to 8 mA
	High signal	12 to 16 mA

If the result is not as specified, replace the transmission revolution sensor (SP2).

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OE206VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SPEED SENSOR: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION REVOLUTION SENSOR (SP2)

(a) Coat a new O-ring with ATF and install it to the transmission revolution sensor (SP2).

(b) Install the transmission revolution sensor (SP2) with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

(c) Connect the transmission revolution sensor (SP2) connector.

2. INSTALL TRANSMISSION REVOLUTION SENSOR (NT)

(a) Coat a new O-ring with ATF and install it to the transmission revolution sensor (NT).

(b) Install the transmission revolution sensor (NT) with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

(c) Connect the transmission revolution sensor (NT) connector.

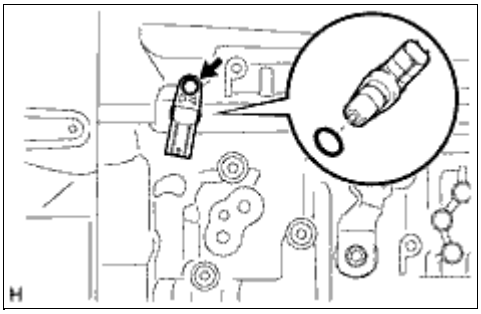
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000OE406SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: SPEED SENSOR: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. REMOVE TRANSMISSION REVOLUTION SENSOR (NT)

(a) Disconnect the transmission revolution sensor (NT) connector.

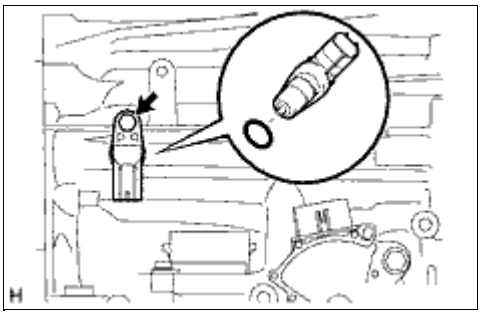


(b) Remove the bolt and transmission revolution sensor (NT).

(c) Remove the O-ring from the transmission revolution sensor (NT).

2. REMOVE TRANSMISSION REVOLUTION SENSOR (SP2)

(a) Disconnect the transmission revolution sensor (SP2) connector.



(b) Remove the bolt and transmission revolution sensor (SP2).

(c) Remove the O-ring from the transmission revolution sensor (SP2).

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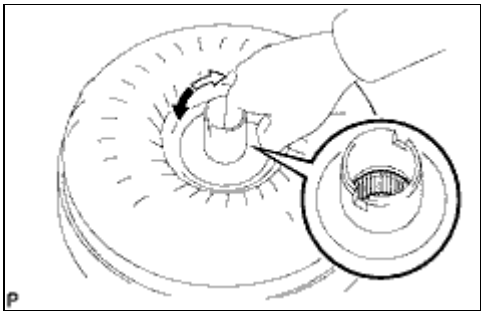
Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000OA102YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TORQUE CONVERTER AND DRIVE PLATE: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TORQUE CONVERTER ASSEMBLY

(a) Inspect the one-way clutch.

(1) Press on the spline of the stator with a finger and rotate the spline. Check that the spline rotates smoothly when turned clockwise and rotates with difficulty when turned counterclockwise.



Text in Illustration

➡	Difficult
⇨	Smooth

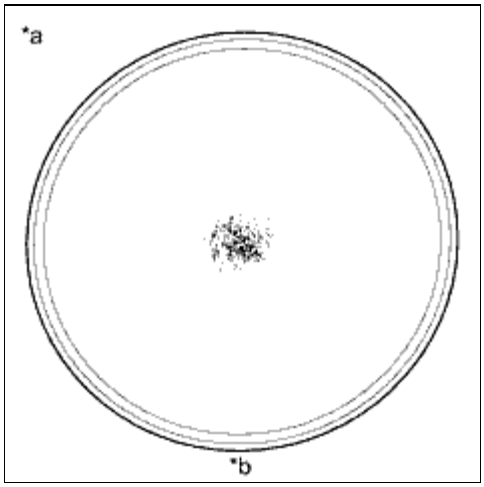
If necessary, clean the torque converter assembly and recheck the one-way clutch. Replace the torque converter assembly if the one-way clutch still fails the inspection.

(b) Inspect the torque converter assembly.

If any of the following problems are present, replace the torque converter assembly.

Text in Illustration

*a	Sample showing maximum allowable amount of powder in ATF
*b	Full Scale



- A metallic sound is emitted from the torque converter assembly during the stall test or when the shift lever is moved to N.
- The one-way clutch turns smoothly or locks in both directions.
- The amount of powder in the ATF is more than the sample shown in the illustration (refer to the sample).

HINT:

The sample shows approximately 0.025 liters (0.026 US qts,

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0.022 Imp. qts) of ATF in Petri dish, which has been taken from a torque converter assembly.

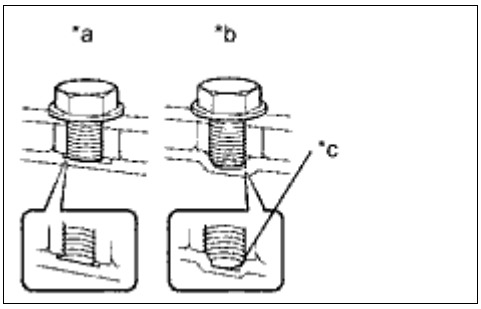
(c) Replace the ATF in the torque converter assembly.

(1) If the ATF is discolored or has a foul odor, stir the ATF in the torque converter assembly and drain it before replacing the ATF.

(d) Prevent deformation of the torque converter and damage to the oil pump gear.

Text in Illustration

*a	Correct
*b	Incorrect
*c	Bottom is damaged



NOTICE:

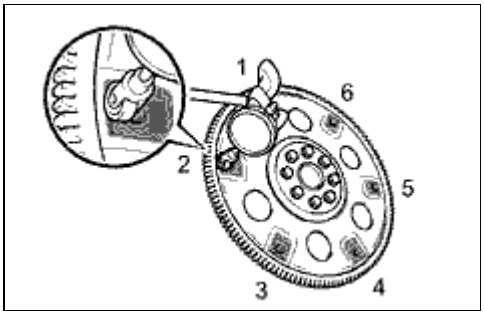
Make sure that all of the bolts are the same length and that the specified bolts are used.

HINT:

If there is any damage to the tip of a bolt for the torque converter assembly or to the bottom of a bolt hole, replace the bolt and torque converter assembly.

2. INSPECT DRIVE PLATE AND RING GEAR SUB-ASSEMBLY

(a) Check the drive plate for damage.



Text in Illustration

▬	Measurement Point

(b) Set up a dial indicator and measure the runout at the 6 areas on the drive plate surface that contact the torque converter assembly.

Maximum runout:
0.30 mm (0.0118 in.)

If the runout is more than the maximum or the drive plate is damaged, replace the drive plate.

for 2GR-FKS: INFO

for 2TR-FE: INFO

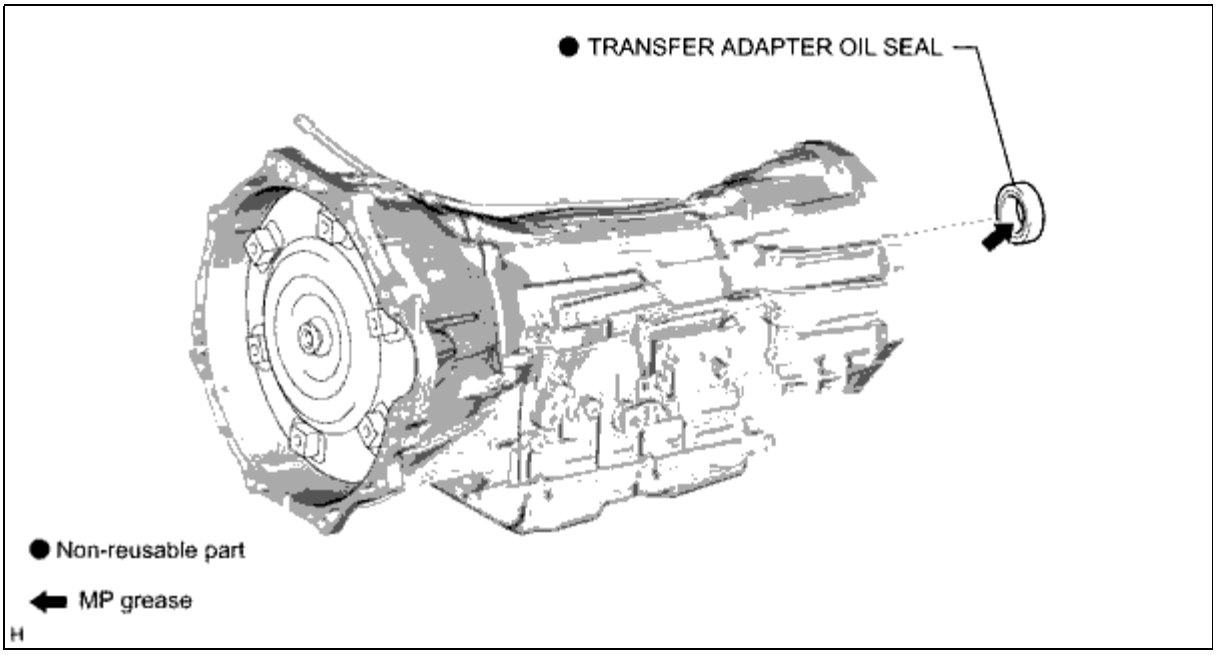
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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000NRX026X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSFER ADAPTER OIL SEAL: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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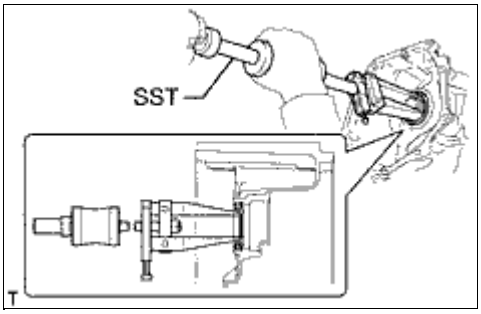
Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000NRY02IX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSFER ADAPTER OIL SEAL: REPLACEMENT; 2016 MY Tacoma [08/2015 -]		

REPLACEMENT

1. REMOVE TRANSFER ASSEMBLY

INFO

2. REMOVE TRANSFER ADAPTER OIL SEAL



(a) Using SST, remove the transfer adapter oil seal.

SST: 09308-00010

3. INSTALL TRANSFER ADAPTER OIL SEAL

(a) Coat the lip of a new transfer adapter oil seal with MP grease.

(b) Using SST and a hammer, tap in the transfer adapter oil seal.

SST: 09950-60010

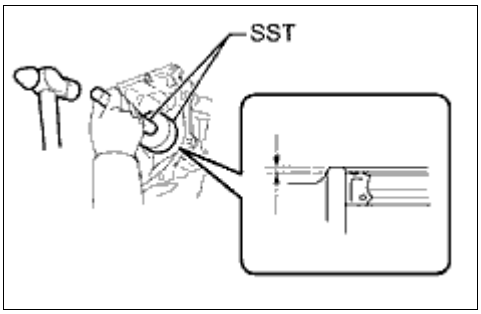
09951-00650

SST: 09950-70010

09951-07150

Standard depth:

0 to 0.5 mm (0 to 0.0196 in.)



NOTICE:

- Make sure that the transfer adapter oil seal is installed in the correct direction.
- Do not damage the lip of the transfer adapter oil seal.

4. INSTALL TRANSFER ASSEMBLY

INFO

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Last Modified: 11-13-2015	6.6 N	**Doc ID:** RM000005VSH000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: ADJUSTMENT; 2016 MY Tacoma [08/2015 -]		

ADJUSTMENT

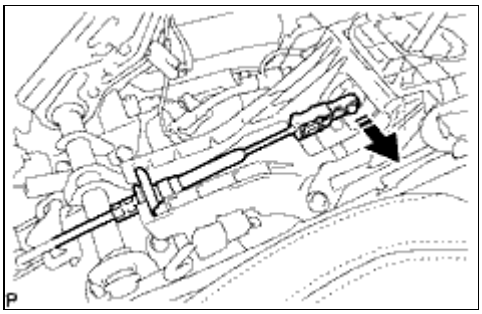
1. REMOVE FRONT CONSOLE BOX

INFO

2. ADJUST TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Move the shift lever to N.

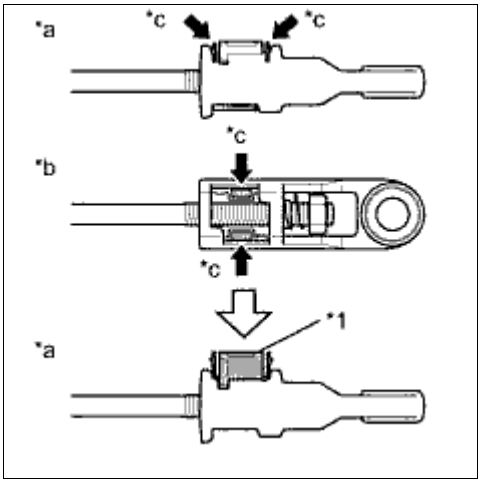
(b) Disconnect the end of the transmission control cable assembly from the transmission floor shift assembly.



Text in Illustration

➡	Disconnect in this Direction

(c) Push the 2 claws together at the top of the transmission control cable lock piece. While holding the 2 claws together, push the 2 lugs on the bottom of the lock piece toward each other and upward to pull out the lock piece.

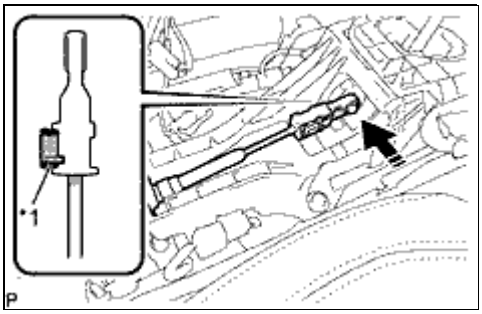


Text in Illustration

*1	Lock Piece
*a	Side View
*b	Bottom View
*c	Push

(d) Connect the end of the transmission control cable assembly to the transmission floor shift assembly.

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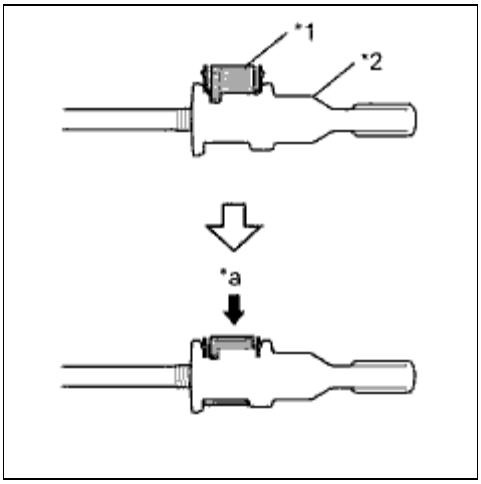
Text in Illustration

*1	Lock Piece
➡	Connect in this Direction

NOTICE:

- Check that the park/neutral position switch and shift lever are in N.
- Make sure that the lock piece is pulled up.
- Push on the end of the cable all the way to the base of the transmission floor shift assembly pin.

(e) Push the lock piece into the adjuster case.



Text in Illustration

*1	Lock Piece
*2	Adjuster Case
*a	Push

NOTICE:

Securely push in the lock piece until it locks.

(f) After adjusting the shift lever position, check the operation and function of the shift lever. If there is a problem, adjust the position again.

3. INSTALL FRONT CONSOLE BOX

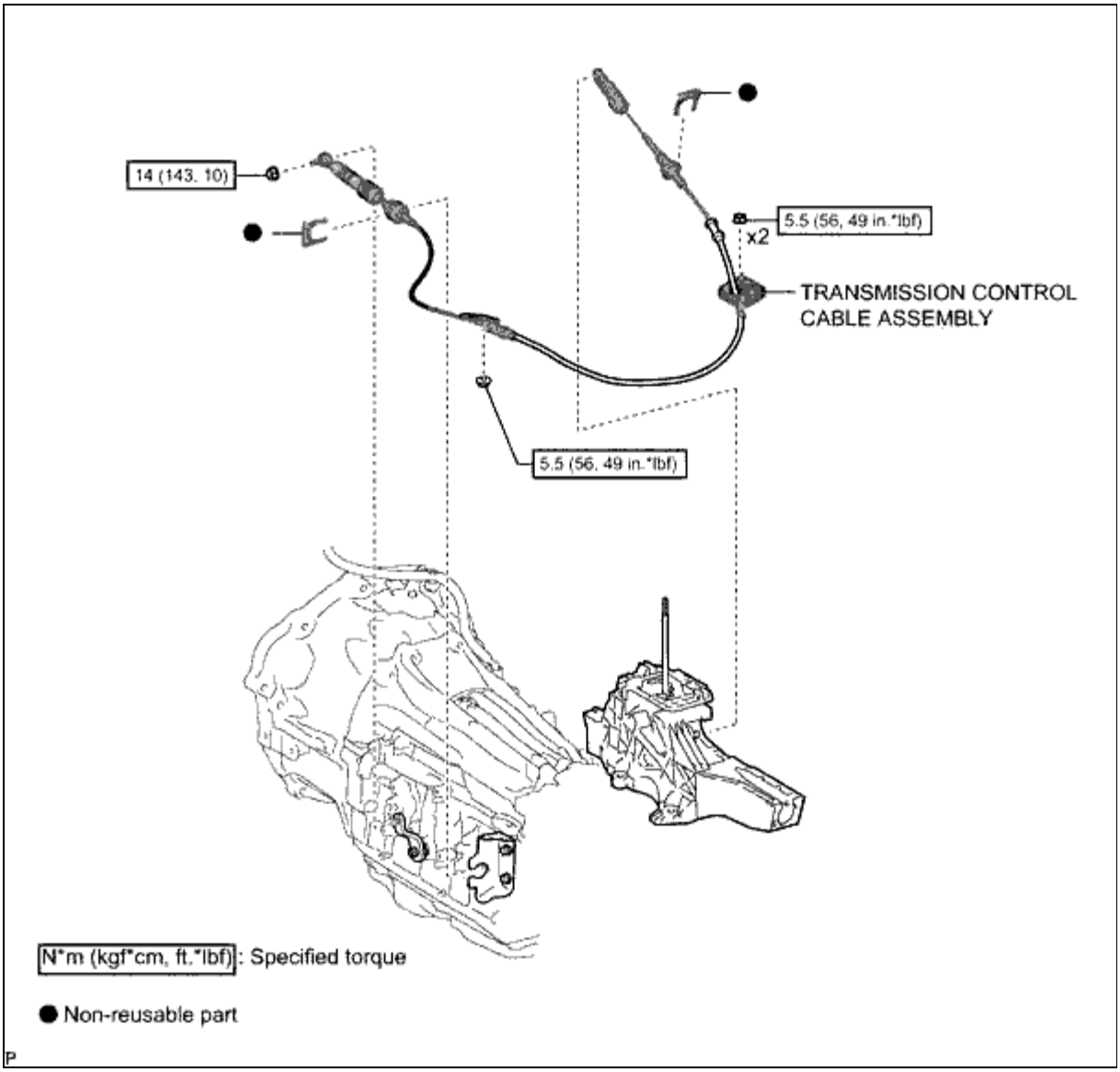
INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005NPB005X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000002ZLK04DX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Install the transmission control cable assembly from outside the vehicle body and attach the 3 claws of the cable retainer.

(b) Install the 2 nuts.

Torque:

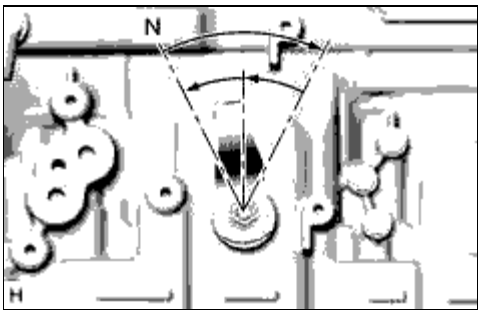
5.5 N·m {56 kgf·cm, 49in·lbf}

(c) Connect the transmission control cable support to the vehicle body with the nut.

Torque:

5.5 N·m {56 kgf·cm, 49in·lbf}

(d) Turn the transmission control shaft lever LH clockwise until it stops, and then return the transmission control shaft lever LH counterclockwise 2 notches to N.



(e) Connect the transmission control cable assembly to the transmission control cable bracket with a new clip, and then connect the cable end to the transmission control shaft lever LH with the nut.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

2. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY INFO

3. INSPECT SHIFT LEVER POSITION INFO

4. REMOVE FRONT CONSOLE BOX

INFO

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000002ZLM04DX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION CONTROL CABLE: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

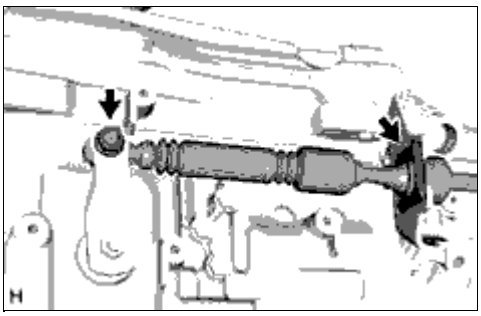
1. REMOVE FRONT CONSOLE BOX

INFO

2. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY INFO

3. REMOVE TRANSMISSION CONTROL CABLE ASSEMBLY

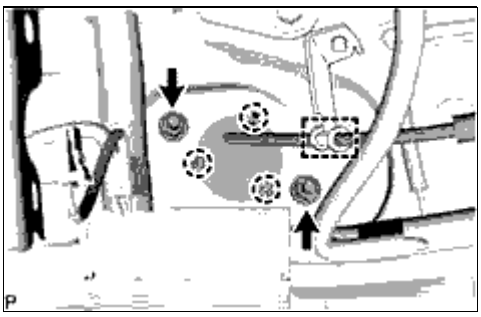
(a) Remove the nut and clip and disconnect the transmission control cable assembly from the automatic transmission assembly.



(b) Remove the nut and disconnect the transmission control cable assembly from the vehicle body.



(c) Detach the clamp to disconnect the transmission control cable support from the transmission control cable clamp.



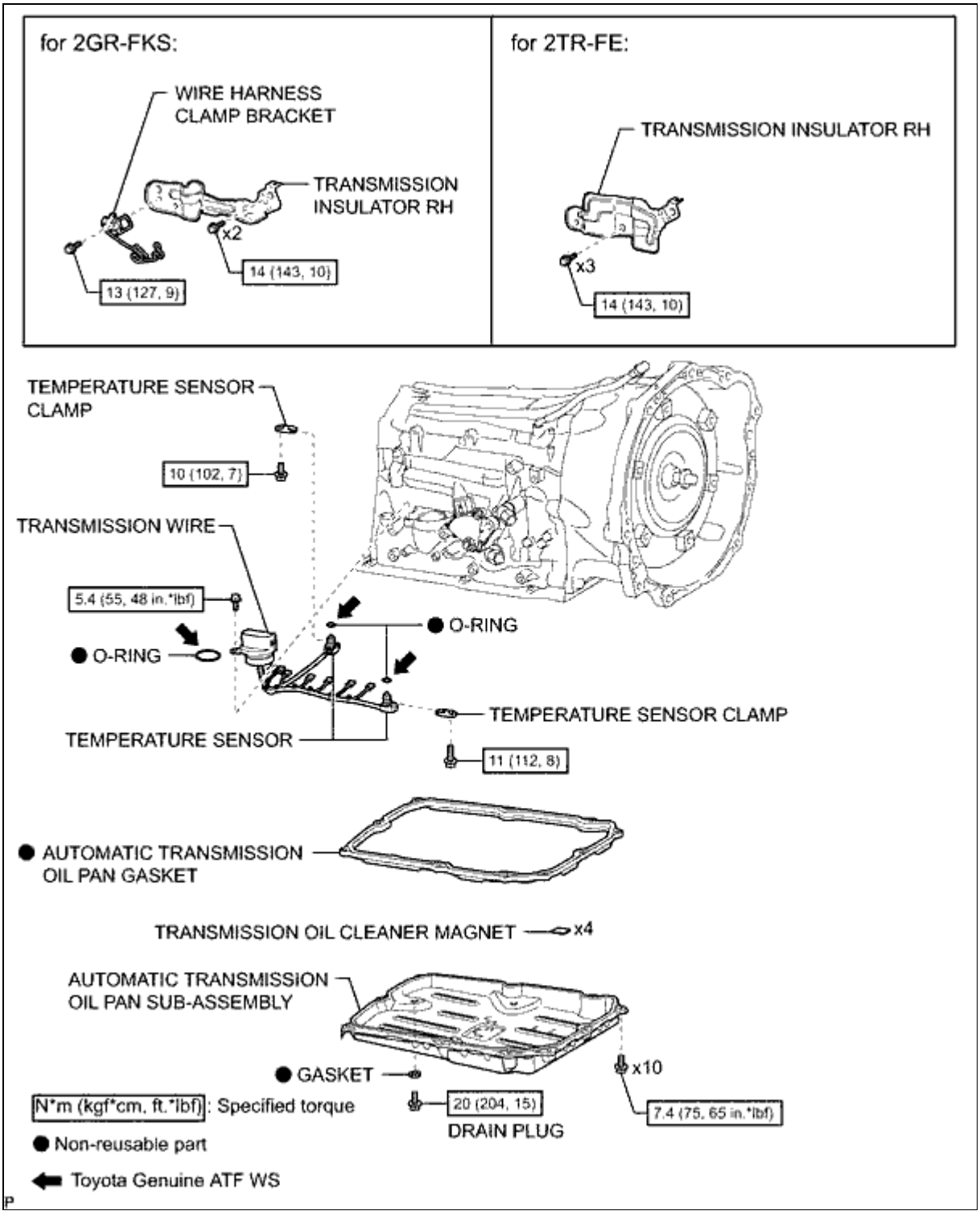
(d) Remove the 2 nuts and detach the 3 claws, and then pull out the transmission control cable assembly from the vehicle body.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9S01IX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000UKG026X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT TRANSMISSION WIRE

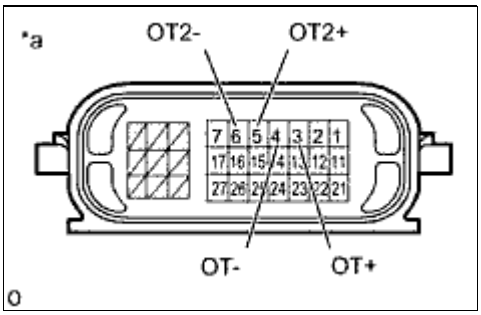
(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Transmission Wire)

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
3 (OT+) - 4 (OT-)	Always	79 Ω to 156 kΩ
5 (OT2+) - 6 (OT2-)	Always	25 Ω to 156 kΩ
3 (OT+) - Body ground 5 (OT2+) - Body ground	Always	10 kΩ or higher
4 (OT-) - Body ground 6 (OT2-) - Body ground	Always	10 kΩ or higher



HINT:

If the resistance is out of the specified range at any of the ATF temperatures shown in the table below, the driveability of the vehicle may decrease.

Standard Resistance:

ATF TEMPERATURE	SPECIFIED CONDITION
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

If the result is not as specified, replace the transmission wire.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000ODT01YX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION WIRE

(a) Coat 2 new O-rings with ATF, and install them to the 2 temperature sensors.

(b) Coat a new O-ring with ATF, and install it to the transmission wire.

(c) Install the transmission wire to the automatic transmission case sub-assembly with the bolt.

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

(d) Connect the transmission wire connector.

HINT:

Push up the lever until the claw of the transmission wire connector makes a connection sound.

2. INSTALL TRANSMISSION INSULATOR RH (for 2GR-FKS)

(a) Install the transmission insulator RH to the automatic transmission assembly with the 2 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

(b) Install the wire harness clamp bracket to the transmission insulator RH with the bolt.

Torque:

13 N·m {127 kgf·cm, 9ft·lbf}

3. INSTALL TRANSMISSION INSULATOR RH (for 2TR-FE)

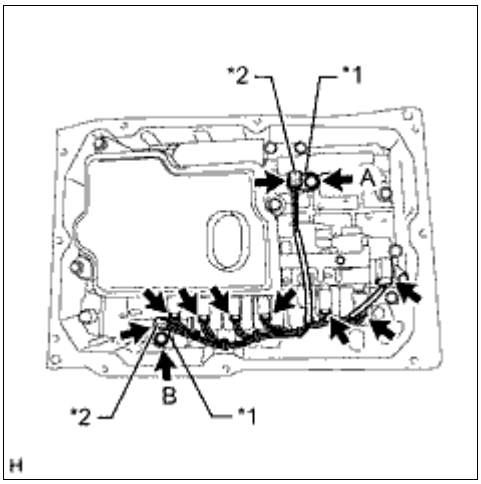
(a) Install the transmission insulator RH to the automatic transmission assembly with the 3 bolts.

Torque:

14 N·m {143 kgf·cm, 10ft·lbf}

4. CONNECT TRANSMISSION WIRE

(a) Connect the 7 solenoid valve connectors.



Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Install the 2 temperature sensors and 2 temperature sensor clamps to the transmission valve body

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assembly with the bolt.

Torque:

for Bolt A -

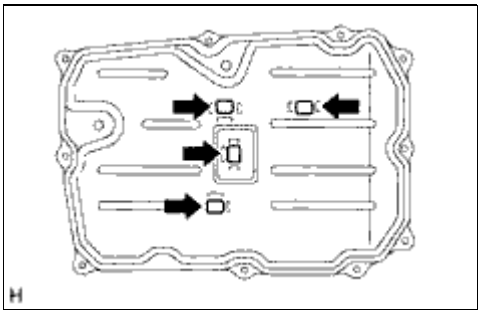
10 N·m {102 kgf·cm, 7ft·lbf}

for Bolt B -

11 N·m {112 kgf·cm, 8ft·lbf}

5. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Install the 4 transmission oil cleaner magnets to the automatic transmission oil pan sub-assembly as shown in the illustration.

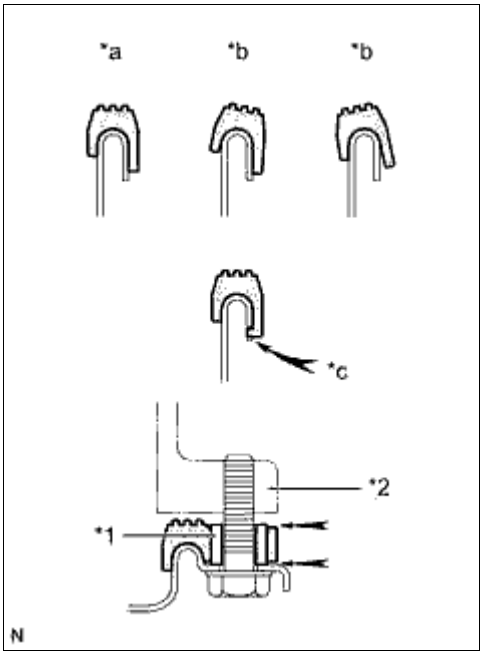


(b) Install a new automatic transmission oil pan gasket to the automatic transmission oil pan sub-assembly.

(c) Install the automatic transmission oil pan sub-assembly with automatic transmission oil pan gasket to the automatic transmission case sub-assembly with the 10 bolts.

Text in Illustration

*1	Sleeve
*2	Automatic Transmission Case Sub-assembly
*a	Correct
*b	Incorrect
*c	Protrusion



Torque:

7.4 N·m {75 kgf·cm, 65in·lbf}

NOTICE:

- Make sure that the automatic transmission oil pan gasket seal surface and automatic transmission oil pan sub-assembly contact surface are free of oil and foreign matter.
- Install the automatic transmission oil pan gasket so that there is no slack in the automatic transmission oil pan gasket, and the entire seal surface is level.
- Make sure that the 8 protrusions are properly engaged to the automatic transmission oil pan sub-assembly.
- When installing the automatic transmission oil pan sub-assembly, make sure that the automatic transmission oil pan gasket is not pinched between the sleeve and the seal surface of the automatic transmission case sub-assembly.

6. ADD AUTOMATIC TRANSMISSION FLUID

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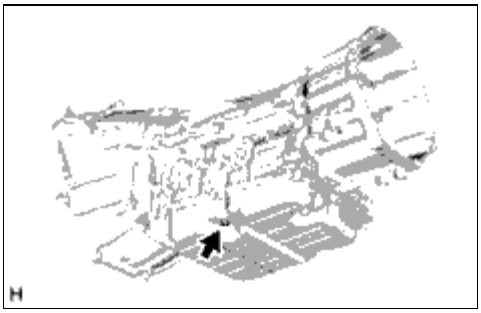
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000ODV01SX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: TRANSMISSION WIRE: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. DRAIN AUTOMATIC TRANSMISSION FLUID

(a) Remove the drain plug and gasket from the automatic transmission assembly and drain the ATF.



(b) Install a new gasket and the drain plug to the automatic transmission assembly.

Torque:

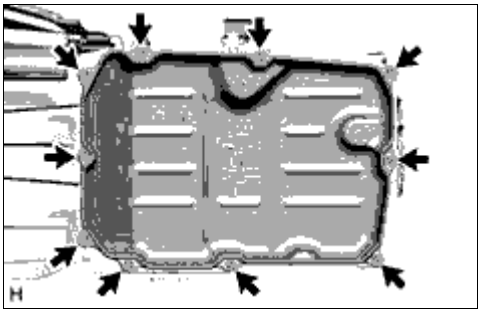
20 N·m {204 kgf·cm, 15ft·lbf}

2. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSEMBLY

(a) Remove the 10 bolts, automatic transmission oil pan sub-assembly and automatic transmission oil pan gasket from the automatic transmission case sub-assembly.

NOTICE:

Some fluid will remain in the automatic transmission oil pan sub-assembly. Remove all of the bolts, and carefully remove the automatic transmission oil pan sub-assembly.



(b) Remove the 4 transmission oil cleaner magnets from the automatic transmission oil pan sub-assembly.

(c) Examine the particles in the automatic transmission oil pan sub-assembly.

(1) Collect any steel chips with the removed transmission oil cleaner magnets. Carefully inspect the foreign matter and particles in the automatic transmission oil pan sub-assembly and on the transmission oil cleaner magnets to anticipate the type of wear you will find in the automatic transmission assembly.

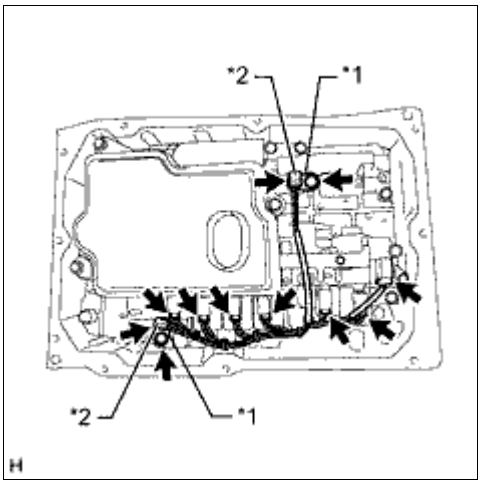
Steel (magnetic): bearing, gear and clutch plate wear

Brass (non-magnetic): bush wear

3. DISCONNECT TRANSMISSION WIRE

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(a) Remove the 2 bolts and the 2 temperature sensor clamps, and disconnect the 2 temperature sensors.



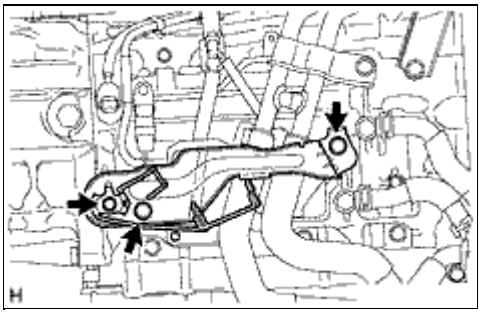
Text in Illustration

*1	Temperature Sensor Clamp
*2	Temperature Sensor

(b) Disconnect the 7 solenoid valve connectors and transmission wire from the transmission valve body assembly.

4. REMOVE TRANSMISSION INSULATOR RH (for 2GR-FKS)

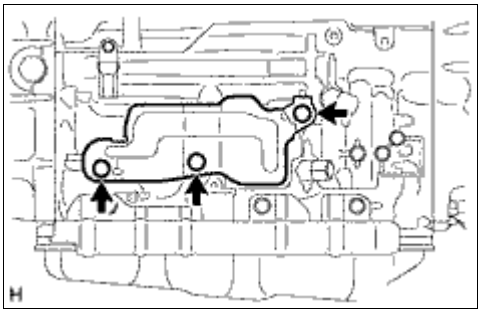
(a) Remove the bolt and wire harness clamp bracket from the transmission insulator RH.



(b) Remove the 2 bolts and transmission insulator RH from the automatic transmission assembly.

5. REMOVE TRANSMISSION INSULATOR RH (for 2TR-FE)

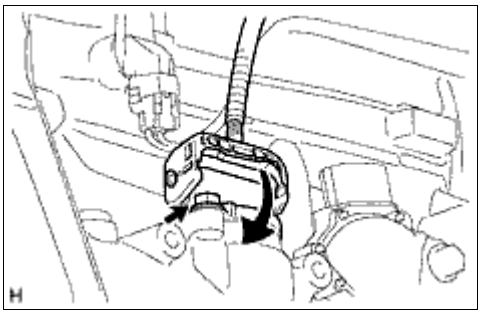
(a) Remove the 3 bolts and transmission insulator RH from the automatic transmission assembly.



6. REMOVE TRANSMISSION WIRE

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(a) Disconnect the transmission wire connector.

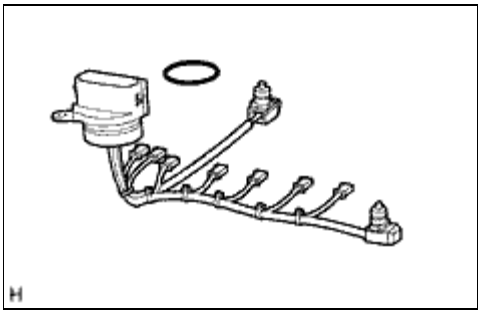


HINT:

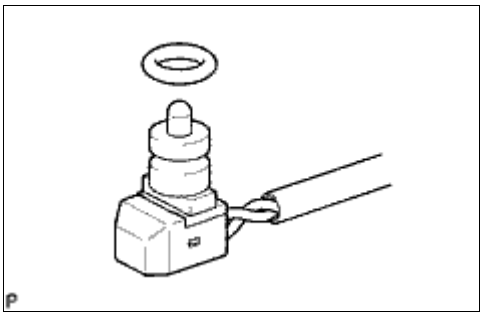
Detach the claw, press down the lever, and disconnect the transmission wire connector.

(b) Remove the bolt and pull out the transmission wire from the automatic transmission case sub-assembly.

(c) Remove the O-ring from the connector of transmission wire.



(d) Remove the 2 O-rings from the 2 temperature sensors.

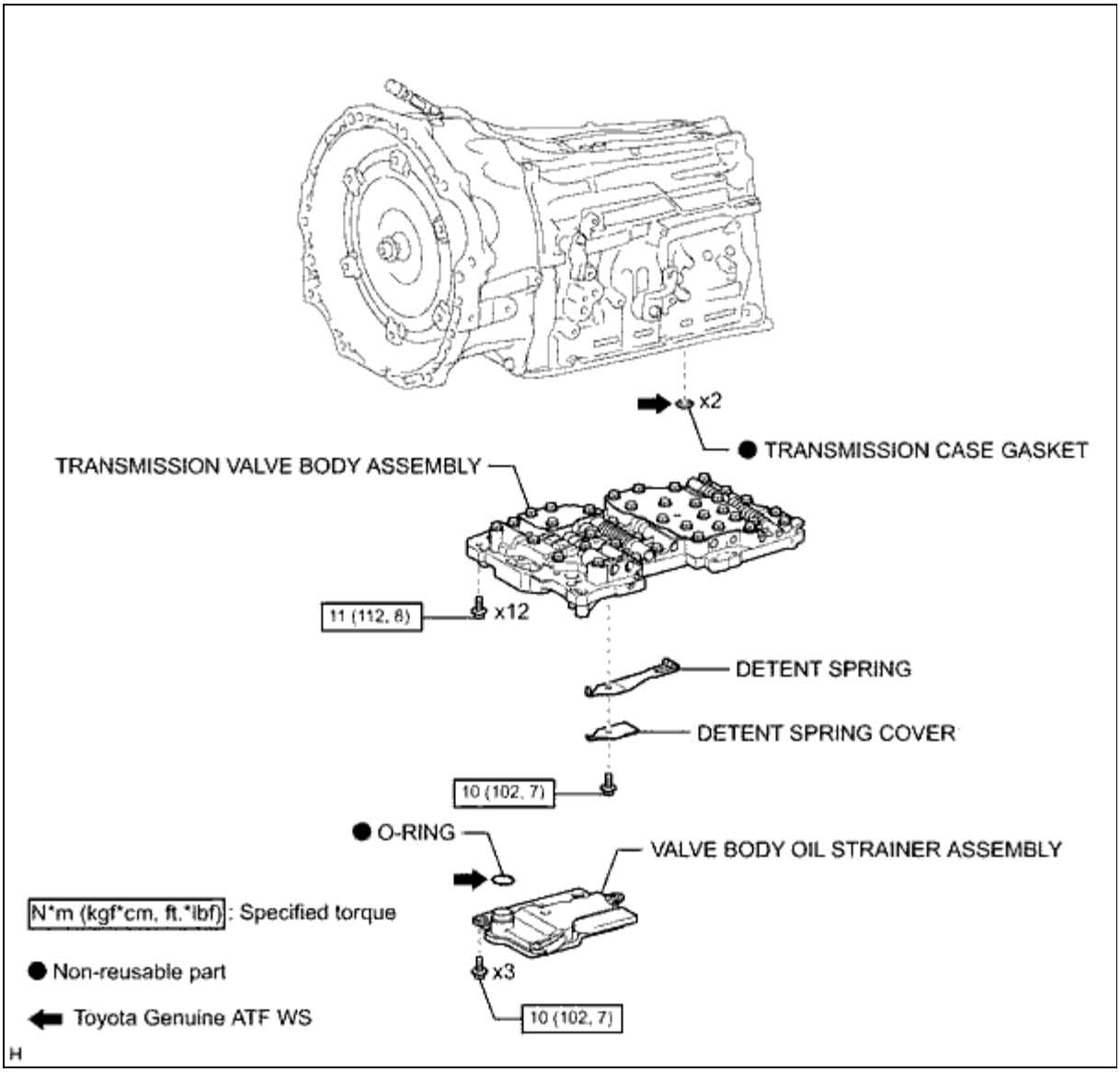


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000000U9Q01VX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

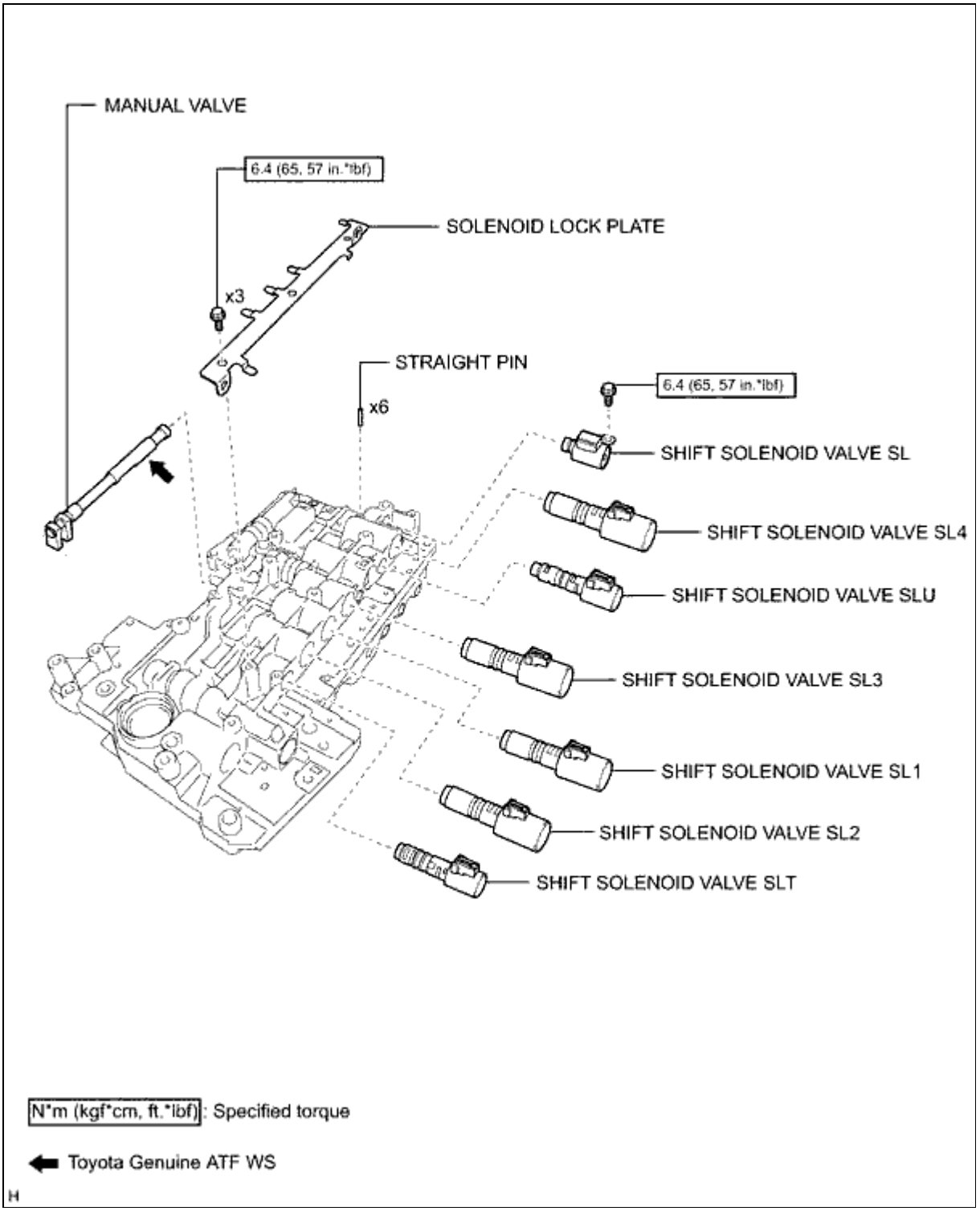
COMPONENTS

ILLUSTRATION



ILLUSTRATION

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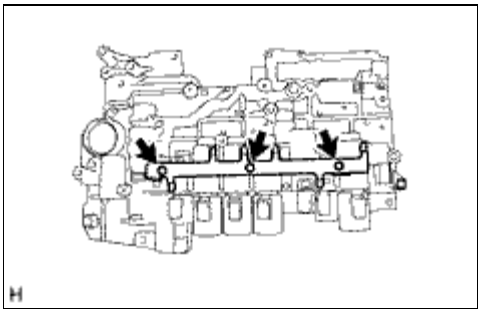
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9L07UX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

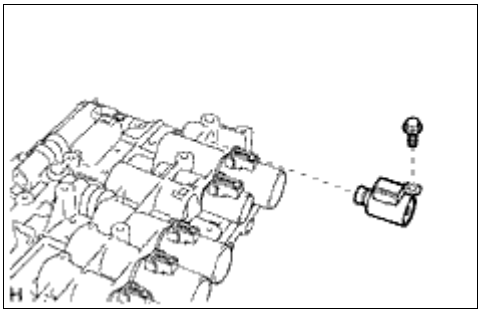
1. REMOVE SOLENOID LOCK PLATE

(a) Remove the 3 bolts and solenoid lock plate from the transmission valve body assembly.



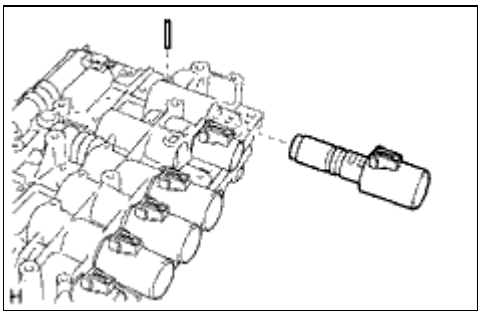
2. REMOVE SHIFT SOLENOID VALVE SL

(a) Remove the bolt and shift solenoid valve SL from the transmission valve body assembly.



3. REMOVE SHIFT SOLENOID VALVE SL4

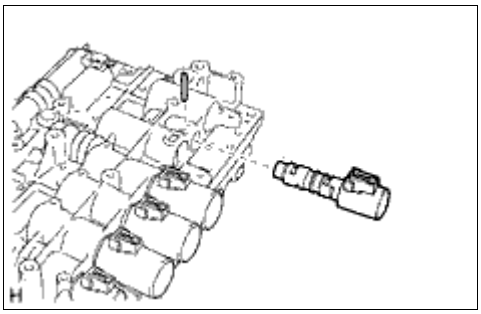
(a) Remove the straight pin and shift solenoid valve SL4 from the transmission valve body assembly.



4. REMOVE SHIFT SOLENOID VALVE SLU

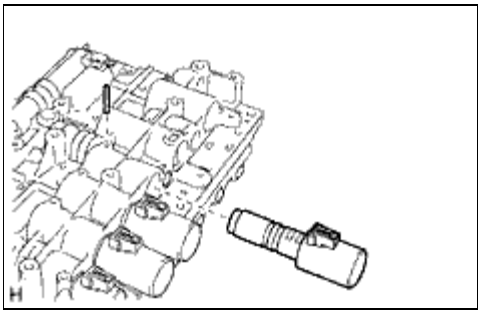
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(a) Remove the straight pin and shift solenoid valve SLU from the transmission valve body assembly.



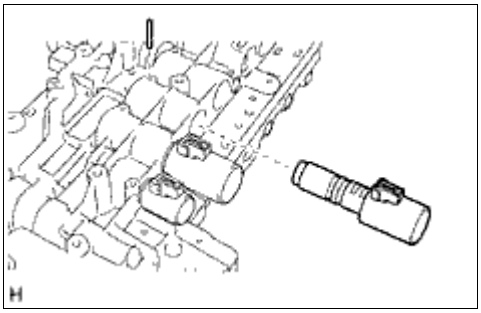
5. REMOVE SHIFT SOLENOID VALVE SL3

(a) Remove the straight pin and shift solenoid valve SL3 from the transmission valve body assembly.



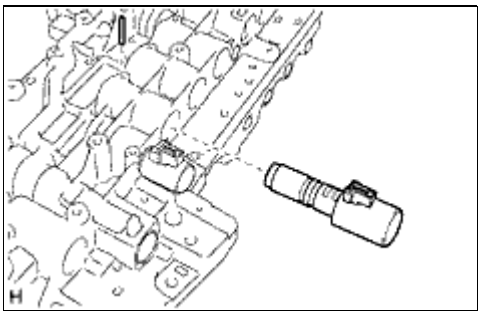
6. REMOVE SHIFT SOLENOID VALVE SL1

(a) Remove the straight pin and shift solenoid valve SL1 from the transmission valve body assembly.



7. REMOVE SHIFT SOLENOID VALVE SL2

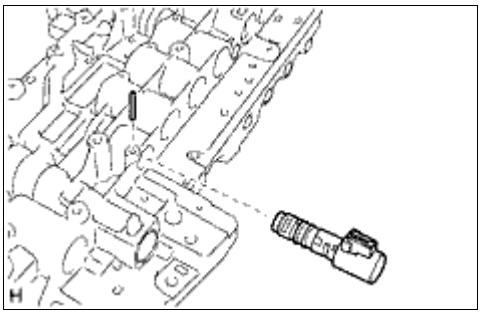
(a) Remove the straight pin and shift solenoid valve SL2 from the transmission valve body assembly.



8. REMOVE SHIFT SOLENOID VALVE SLT

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(a) Remove the straight pin and shift solenoid valve SLT from the transmission valve body assembly.



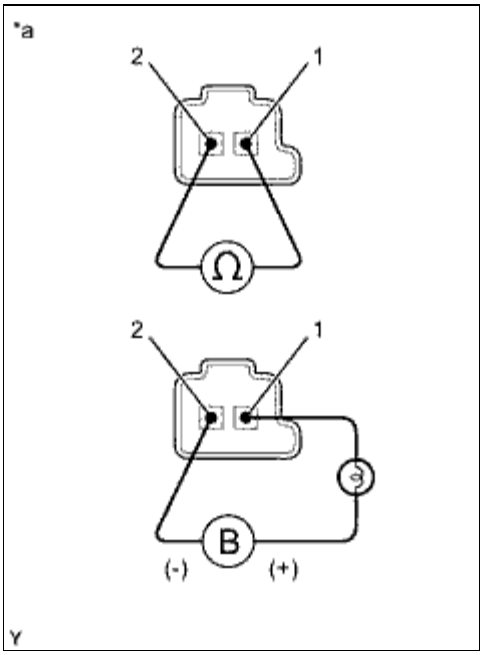
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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000ODH06EX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT SHIFT SOLENOID VALVE SL1

(a) Measure the resistance according to the value(s) in the table below.



Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve SL1)

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
1 - 2	20°C (68°F)	5.0 to 5.6 Ω

If the value is not as specified, replace the shift solenoid valve SL1.

(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) with a 21 W bulb → Terminal 1 • Battery negative (-) → Terminal 2	Valve moves and makes an operating noise

If the operation cannot be done as specified, replace the shift solenoid valve SLT.

2. INSPECT SHIFT SOLENOID VALVE SL2

HINT:

Refer to Inspect Shift Solenoid Valve SL1.

3. INSPECT SHIFT SOLENOID VALVE SL3

HINT:

Refer to Inspect Shift Solenoid Valve SL1.

4. INSPECT SHIFT SOLENOID VALVE SL4

HINT:

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Refer to Inspect Shift Solenoid Valve SL1.

5. INSPECT SHIFT SOLENOID VALVE SLU

HINT:

Refer to Inspect Shift Solenoid Valve SL1.

6. INSPECT SHIFT SOLENOID VALVE SLT

HINT:

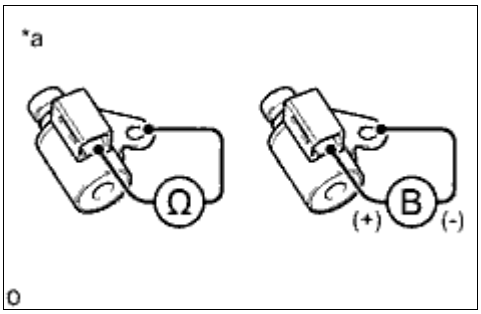
Refer to Inspect Shift Solenoid Valve SL1.

7. INSPECT SHIFT SOLENOID VALVE SL

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Component without harness connected (Shift Solenoid Valve SL)



Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Shift solenoid valve SL connector terminal - Shift solenoid valve SL body	20°C (68°F)	11 to 15 Ω

If the value is not as specified, replace the shift solenoid valve SL.

(b) Apply 12 V battery voltage to the shift solenoid valve and check that the valve moves and makes an operating noise.

OK:

MEASUREMENT CONDITION	SPECIFIED CONDITION
• Battery positive (+) → Shift solenoid valve SL connector • Battery negative (-) → Shift solenoid valve SL body	Valve moves and makes an operating noise

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9I02DX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSMISSION CASE GASKET

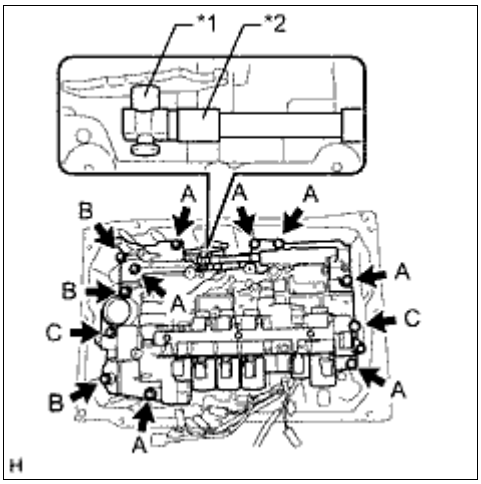
(a) Install 2 new transmission case gaskets to the automatic transmission case sub-assembly.

2. INSTALL MANUAL VALVE

(a) Coat the manual valve with ATF and install it to the transmission valve body assembly.

3. INSTALL TRANSMISSION VALVE BODY ASSEMBLY

(a) Insert the manual valve lever sub-assembly into the groove on the end of the manual valve and install the transmission valve body assembly to the automatic transmission case sub-assembly with the 12 bolts.



Text in Illustration

*1	Manual Valve Lever Sub-assembly
*2	Manual Valve

Torque:

11 N·m {112 kgf·cm, 8ft·lbf}

HINT:

Bolt length:

- Bolt A: 25 mm (0.984 in.)
- Bolt A: 36 mm (1.42 in.)
- Bolt A: 50 mm (1.97 in.)

(b) Install the detent spring and detent spring cover to the transmission valve body assembly with the bolt.

Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

4. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the valve body oil strainer assembly.

(b) Install the valve body oil strainer assembly to the transmission valve body assembly with the 3 bolts.

Torque:

10 N·m {102 kgf·cm, 7ft·lbf}

5. CONNECT TRANSMISSION WIRE

INFO

6. CHECK AUTOMATIC TRANSMISSION SYSTEM

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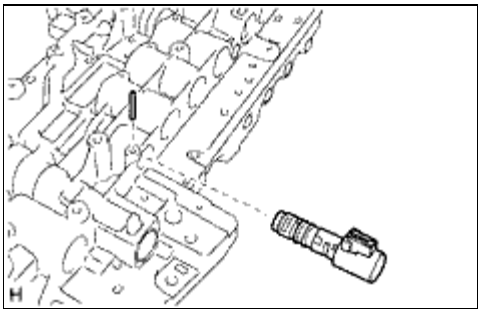
cardiagn.com

Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9M07UX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

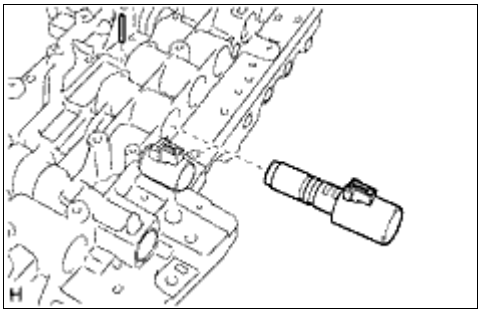
1. INSTALL SHIFT SOLENOID VALVE SLT

(a) Install the shift solenoid valve SLT and straight pin to the transmission valve body assembly.



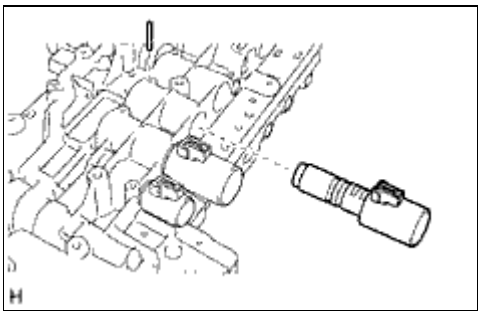
2. INSTALL SHIFT SOLENOID VALVE SL2

(a) Install the shift solenoid valve SL2 and straight pin to the transmission valve body assembly.



3. INSTALL SHIFT SOLENOID VALVE SL1

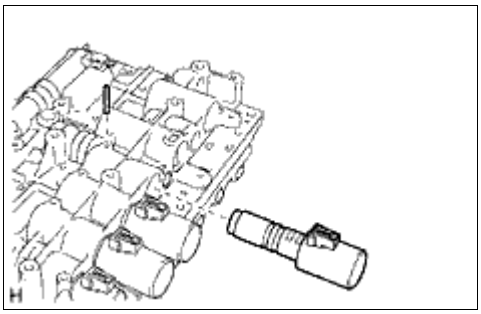
(a) Install the shift solenoid valve SL1 and straight pin to the transmission valve body assembly.



4. INSTALL SHIFT SOLENOID VALVE SL3

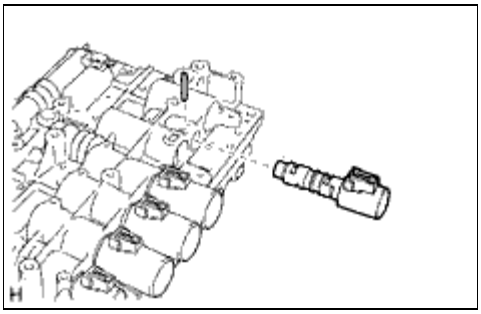
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(a) Install the shift solenoid valve SL3 and straight pin to the transmission valve body assembly.



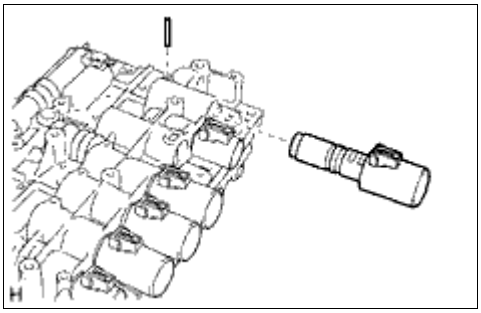
5. INSTALL SHIFT SOLENOID VALVE SLU

(a) Install the shift solenoid valve SLU and straight pin to the transmission valve body assembly.



6. INSTALL SHIFT SOLENOID VALVE SL4

(a) Install the shift solenoid valve SL4 and straight pin to the transmission valve body assembly.

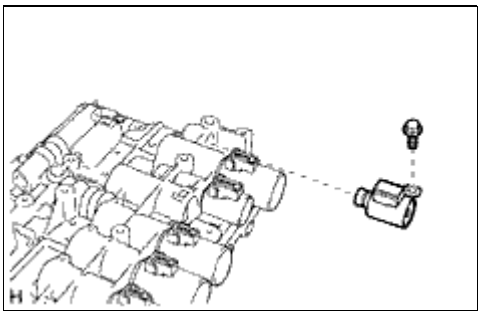


7. INSTALL SHIFT SOLENOID VALVE SL

(a) Install the shift solenoid valve SL and straight pin to the transmission valve body assembly.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



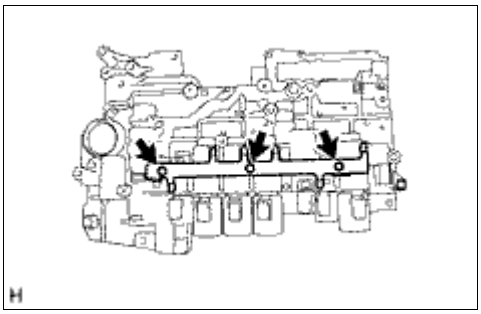
8. INSTALL SOLENOID LOCK PLATE

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(a) Install the solenoid lock plate to the transmission valve body assembly with the 3 bolts.

Torque:

6.4 N·m {65 kgf·cm, 57in·lbf}



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000O9K026X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: AC60F AUTOMATIC TRANSMISSION: VALVE BODY ASSEMBLY: REMOVAL; 2016 MY Tacoma [08/2015 -]		

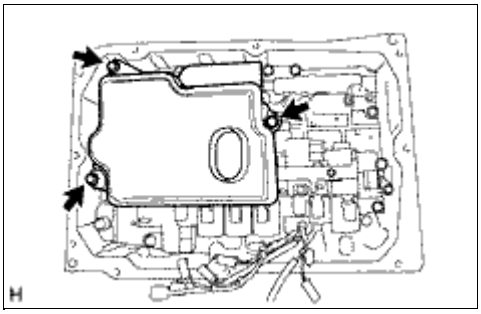
REMOVAL

1. DISCONNECT TRANSMISSION WIRE

INFO

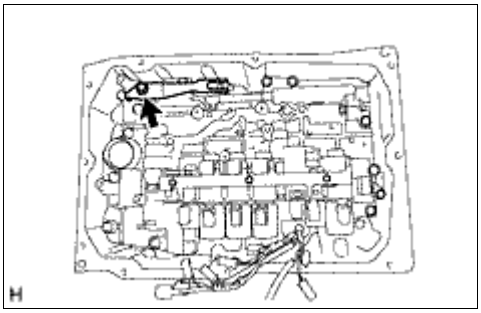
2. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

(a) Remove the 3 bolts and valve body oil strainer assembly from the transmission valve body assembly.

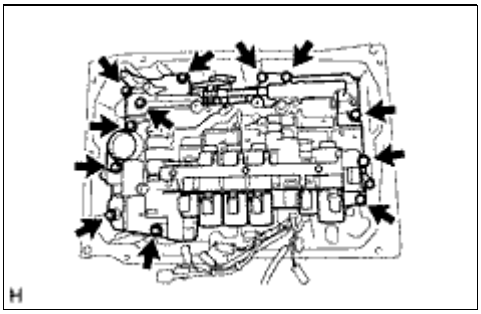


3. REMOVE TRANSMISSION VALVE BODY ASSEMBLY

(a) Remove the bolt, detent spring cover and detent spring from the transmission valve body assembly.



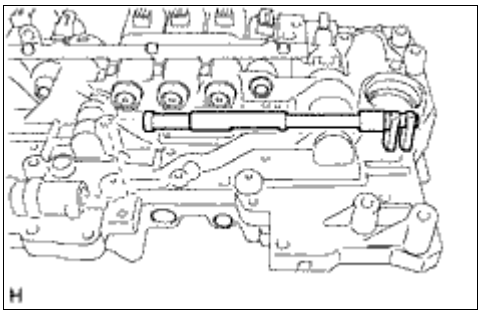
(b) Remove the 12 bolts and transmission valve body assembly from the automatic transmission case sub-assembly.



4. REMOVE MANUAL VALVE

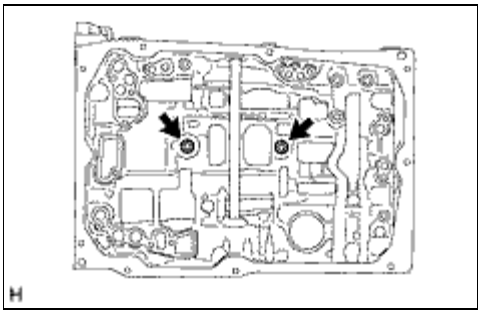
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(a) Remove the manual valve from the transmission valve body assembly.



5. REMOVE TRANSMISSION CASE GASKET

(a) Remove the 2 transmission case gaskets from the automatic transmission case sub-assembly.

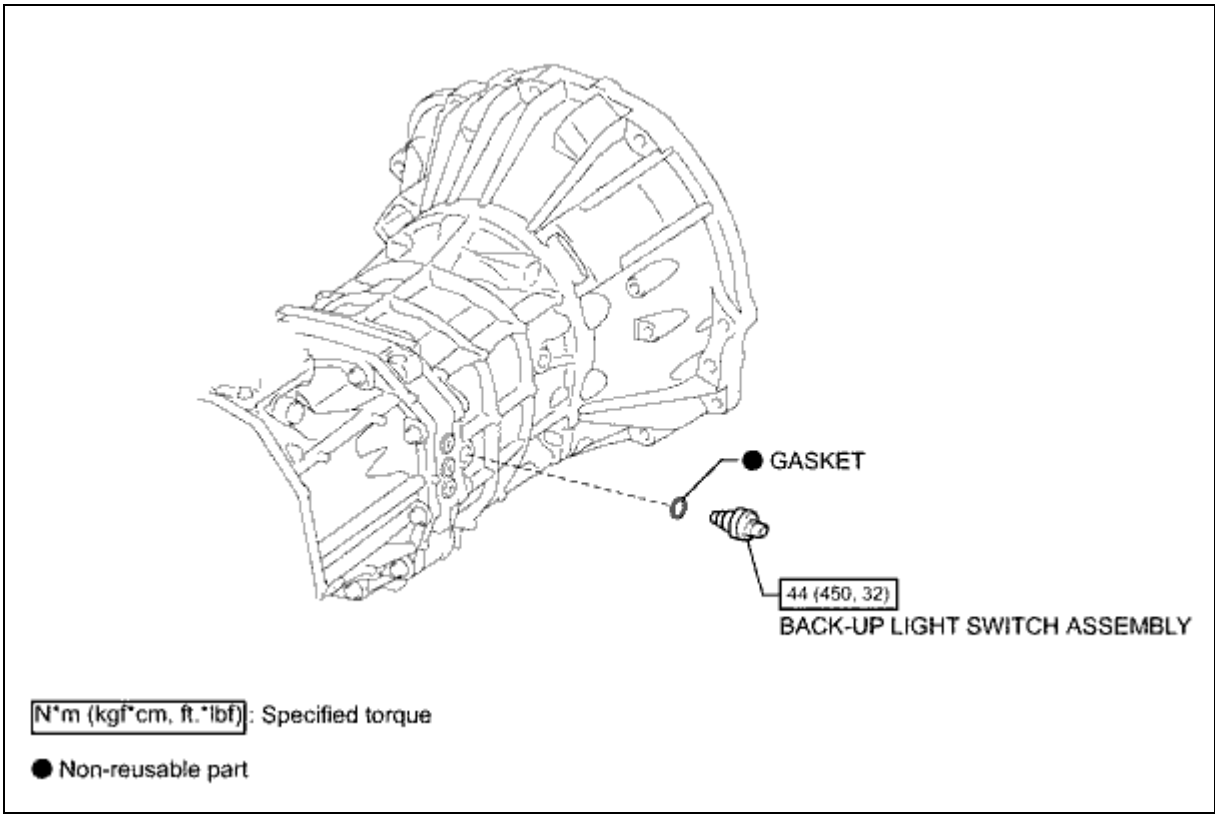


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM0000046SV00RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM0000046SU00RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

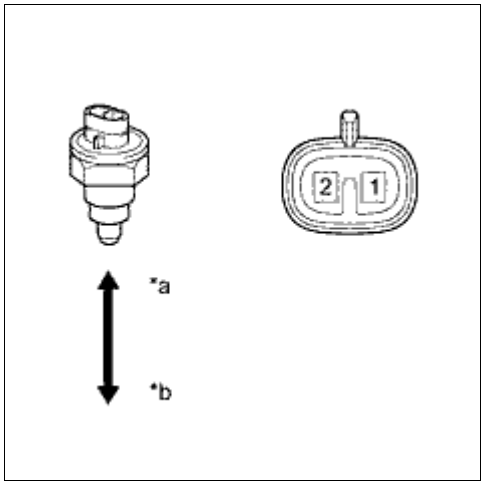
1. INSPECT BACK-UP LIGHT SWITCH ASSEMBLY

(a) Check the resistance.

(1) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Pushed
*b	Released



Standard Resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
1 - 2	Pushed	Below 1 Ω
1 - 2	Released	10 kΩ or higher

If the result is not as specified, replace the back-up light switch assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000046ST00RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL BACK-UP LIGHT SWITCH ASSEMBLY

(a) Using SST, install a new gasket and the back-up light switch assembly to the transmission case.

SST: 09817-16011

Torque:

44 N·m {450 kgf·cm, 32ft·lbf}

(b) Connect the connector.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM0000046SW00RX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: REMOVAL; 2016 MY Tacoma [08/2015 -]		

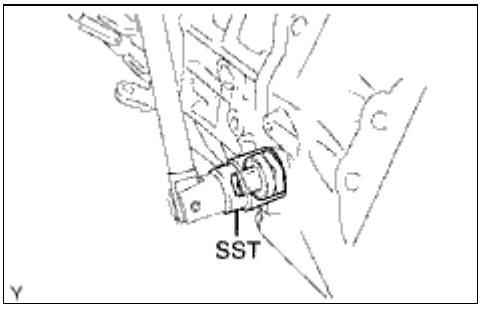
REMOVAL

1. REMOVE BACK-UP LIGHT SWITCH ASSEMBLY

(a) Disconnect the connector.

(b) Using SST, remove the back-up light switch assembly and gasket from the transmission case.

SST: 09817-16011

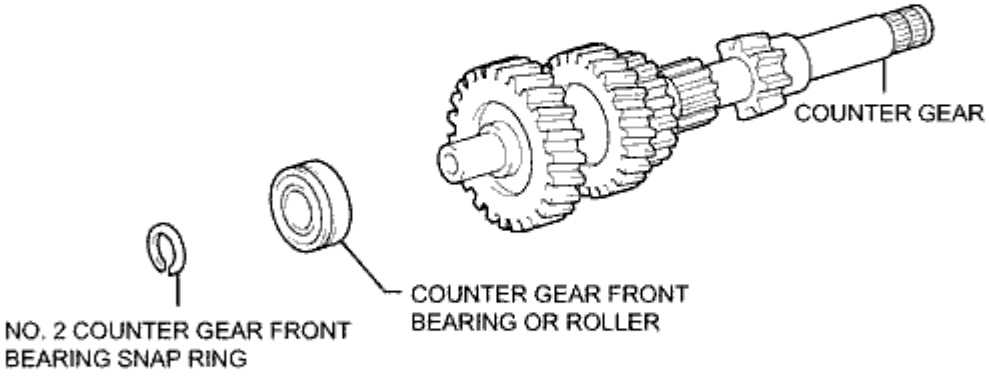


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM0000019XT00OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: COUNTER GEAR: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

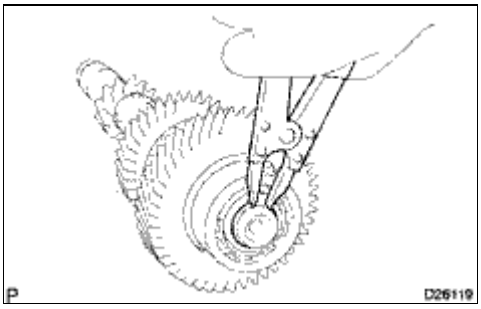
ILLUSTRATION



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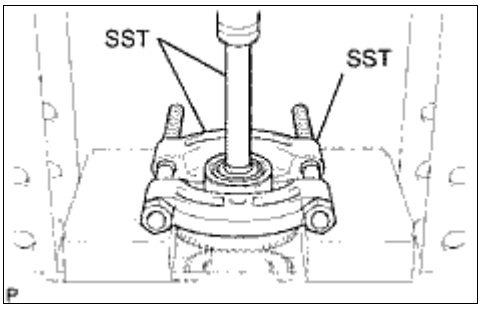
Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176W00OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: COUNTER GEAR: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY



1. REMOVE NO. 2 COUNTER GEAR FRONT BEARING SNAP RING

(a) Using a snap ring expander, remove the front No. 2 counter gear bearing snap ring from the counter gear.



2. REMOVE COUNTER GEAR FRONT BEARING OR ROLLER

(a) Using SST and a press, remove the counter gear front bearing from the counter gear.

SST: 09950-00020

SST: 09950-60010

09951-00220

SST: 09950-70010

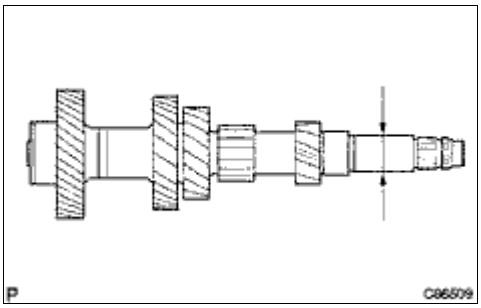
09951-07100

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM00000176V00OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: COUNTER GEAR: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT COUNTER GEAR



(a) Using a micrometer, measure the outer diameter of the counter gear as shown in the diagram.

Standard diameter:
29.984 to 30.000 mm(1.1805 to 1.1811 in.)
Minimum diameter:
29.984 mm (1.1805 in.)

If the outer diameter is less than the minimum, replace the counter gear with a new one.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176X00OX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: COUNTER GEAR: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

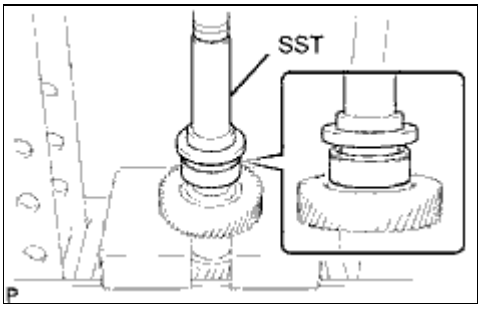
REASSEMBLY

1. INSTALL COUNTER GEAR FRONT BEARING OR ROLLER

(a) Using SST and a press, install the counter gear front bearing onto the counter gear.

SST: 09515-10010

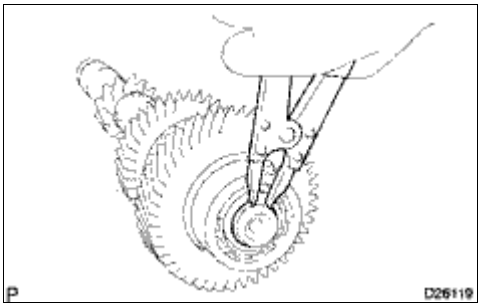
Install it so that the snap ring groove of the bearing faces to the front side.



2. INSTALL NO. 2 COUNTER GEAR FRONT BEARING SNAP RING

(a) Select the correct front No. 2 counter gear bearing snap ring so that the clearance between the counter gear and front No. 2 counter gear bearing snap ring is within the specified values. Using a brass bar and a hammer, install it onto the counter gear.

Standard clearance:
0.1 mm (0.0039 in.) or less



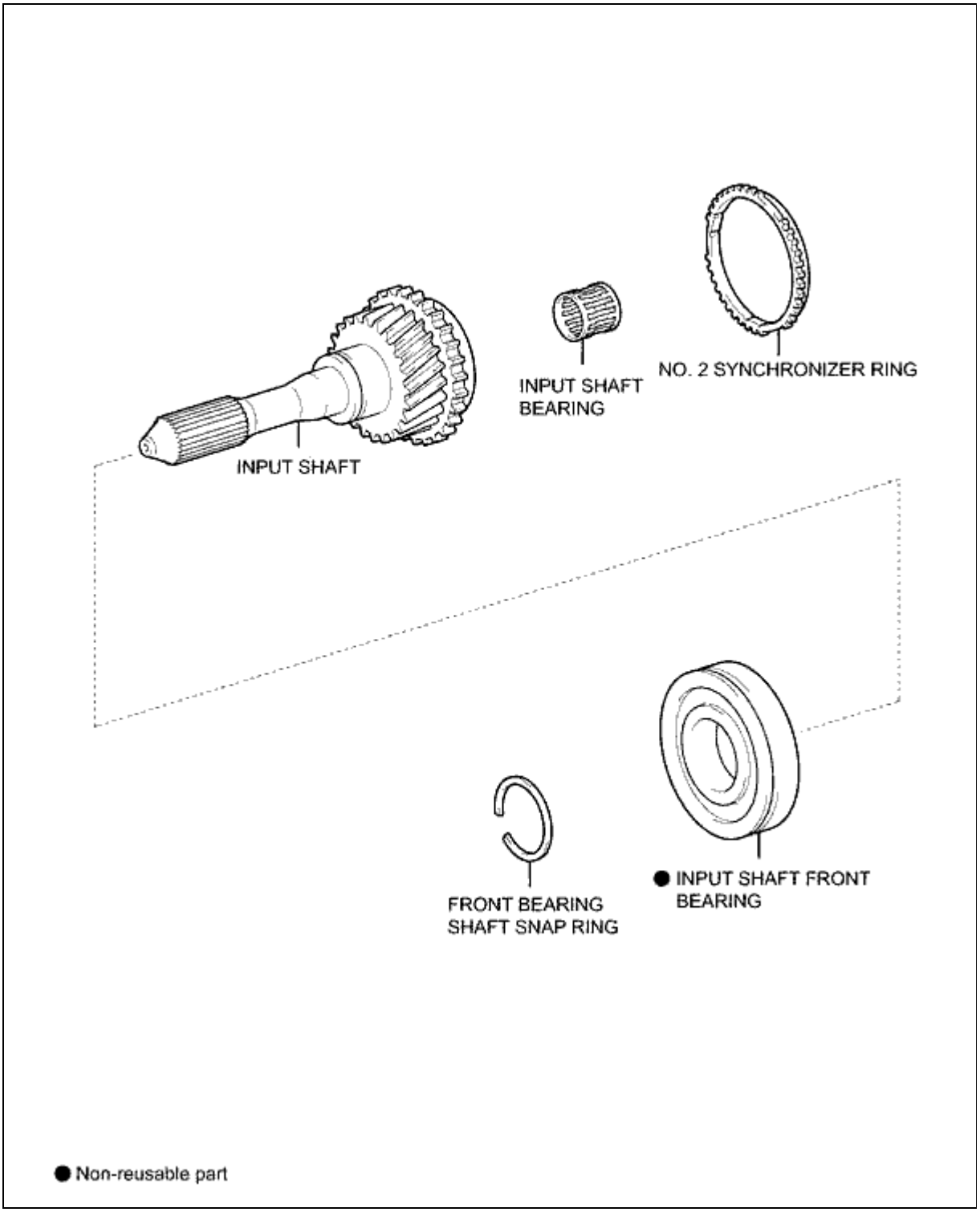
MARK	THICKNESS MM (IN.)
A	2.05 to 2.10 (0.0807 to 0.0827)
B	2.10 to 2.15 (0.0827 to 0.0846)
C	2.15 to 2.20 (0.0846 to 0.0866)
D	2.20 to 2.25 (0.0866 to 0.0886)
E	2.25 to 2.30 (0.0886 to 0.0906)
F	2.30 to 2.35 (0.0906 to 0.0925)

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM0000019XR00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: INPUT SHAFT: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



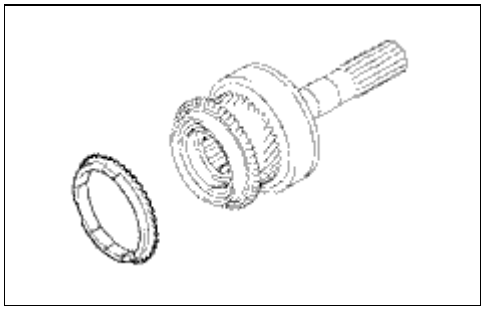
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176N00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: INPUT SHAFT: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

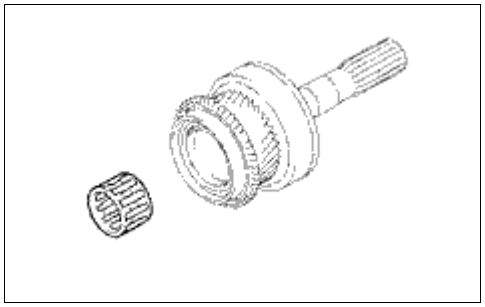
1. REMOVE NO. 2 SYNCHRONIZER RING

(a) Remove No. 2 synchronizer ring from the input shaft.



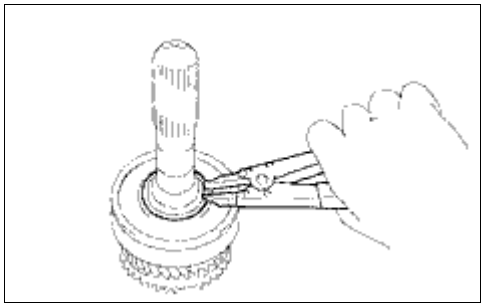
2. REMOVE INPUT SHAFT BEARING

(a) Remove the input shaft bearing from the input shaft.



3. REMOVE FRONT BEARING SHAFT SNAP RING

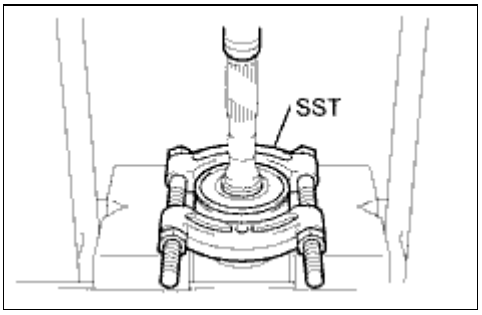
(a) Using a snap ring expander, remove the front bearing shaft snap ring from the input shaft.



4. REMOVE INPUT SHAFT FRONT BEARING

(a) Using SST and a press, remove the input shaft front bearing FR from the input shaft.

SST: 09950-00020

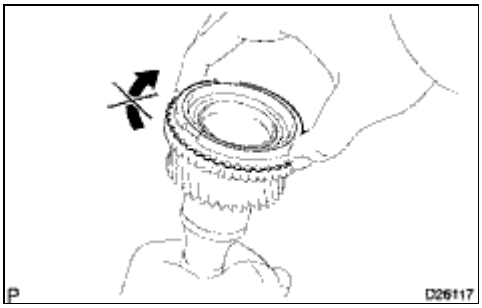


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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM00000176M00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: INPUT SHAFT: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT NO. 2 SYNCHRONIZER RING

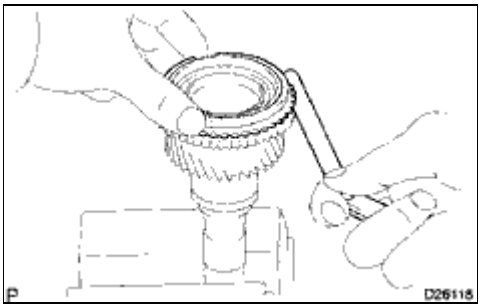


(a) Apply gear oil to the cone of the input shaft, and check that it does not turn in both directions while pushing the No. 2 synchronizer ring.

(b) Check the clearance between the No. 2 synchronizer ring and input shaft while pushing the No. 2 synchronizer ring to the cone of the input shaft.

Standard clearance:
0.70 to 1.70 mm (0.0276 to 0.0669 in.)

If the clearance is not within the specified values, replace No. 2 synchronizer ring with a new one.



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176O00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: INPUT SHAFT: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. INSTALL INPUT SHAFT FRONT BEARING

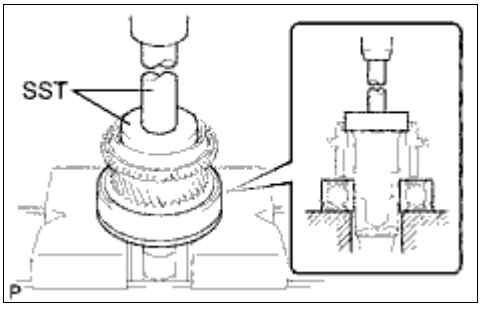
(a) Using SST and a press, install a new input shaft front bearing FR onto the input shaft.

SST: 09950-60010

09951-00570

SST: 09950-70010

09951-07100



NOTICE:

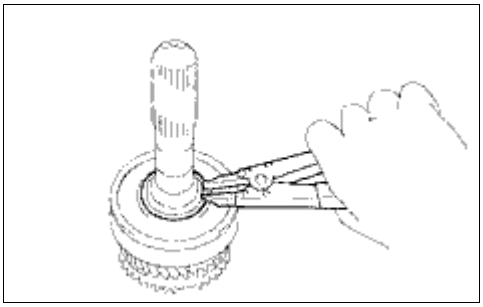
Install the input shaft front bearing with the snap ring groove facing to the front.

2. INSTALL FRONT BEARING SHAFT SNAP RING

(a) Select the correct input shaft front bearing snap ring so that the clearance between the input shaft and input shaft front bearing is within the specified values.

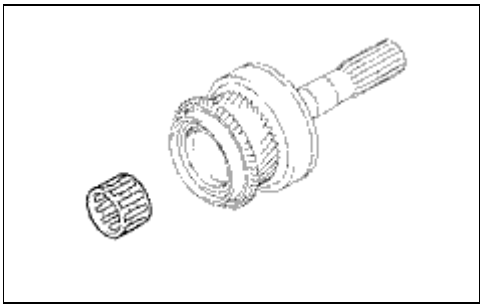
Standard clearance:
0.1 mm (0.00393 in.) or less

MARK	THICKNESS MM (IN.)
A	2.10 to 2.15 (0.0827 to 0.0846)
B	2.15 to 2.20 (0.0846 to 0.0866)
C	2.20 to 2.25 (0.0866 to 0.0886)
D	2.25 to 2.30 (0.0886 to 0.0906)
E	2.30 to 2.35 (0.0906 to 0.0925)
F	2.35 to 2.40 (0.0925 to 0.0945)
G	2.40 to 2.45 (0.0945 to 0.0965)

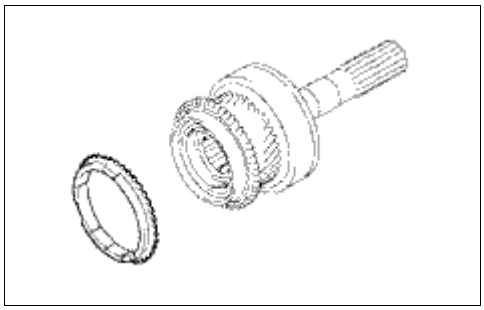


3. INSTALL INPUT SHAFT BEARING

(a) Apply gear oil to the input shaft bearing and install it onto the input shaft.



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4. INSTALL NO. 2 SYNCHRONIZER RING

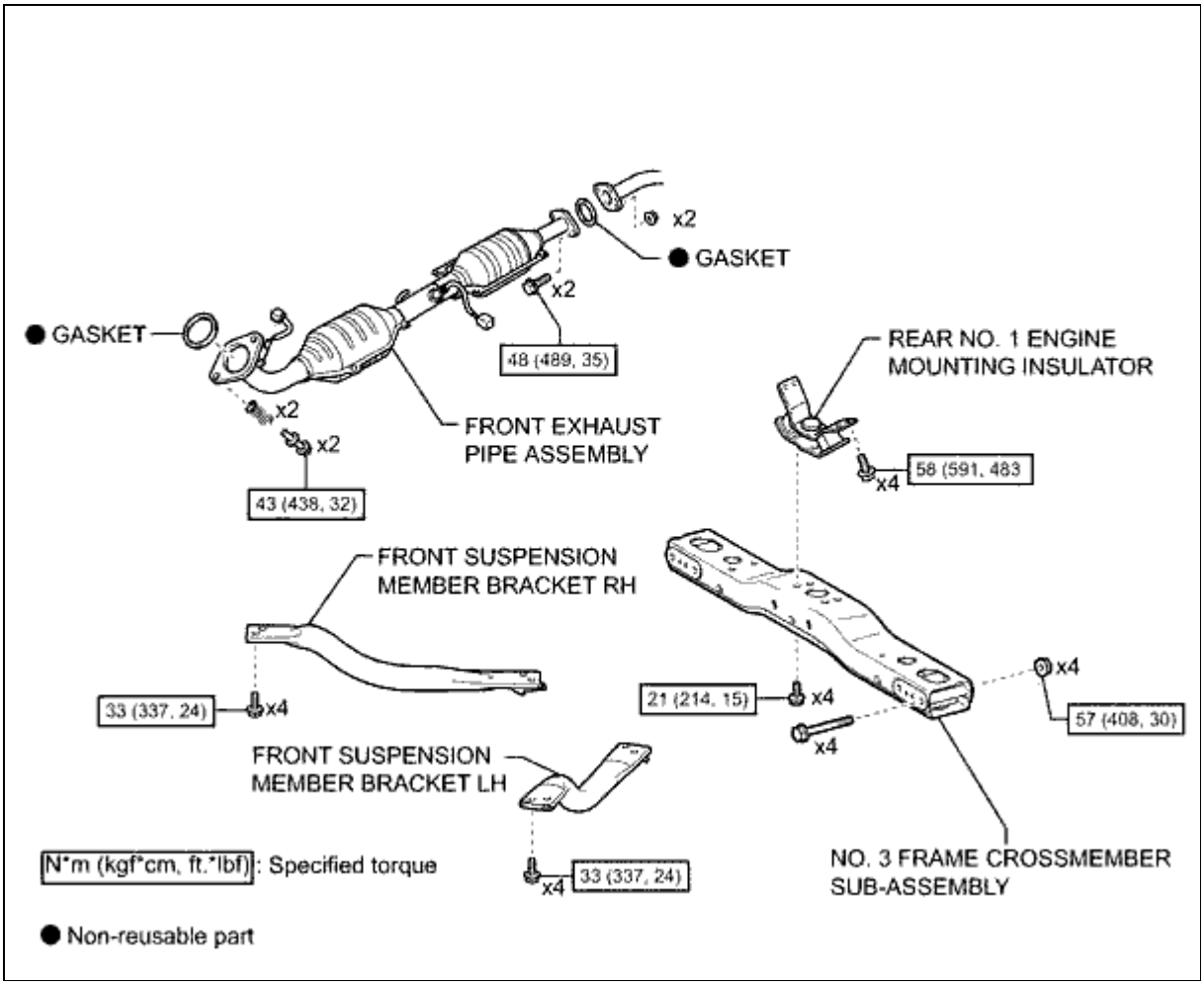
(a) Apply gear oil to synchronizer ring No. 2, and install it onto the input shaft.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM00000177100AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION ASSEMBLY: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

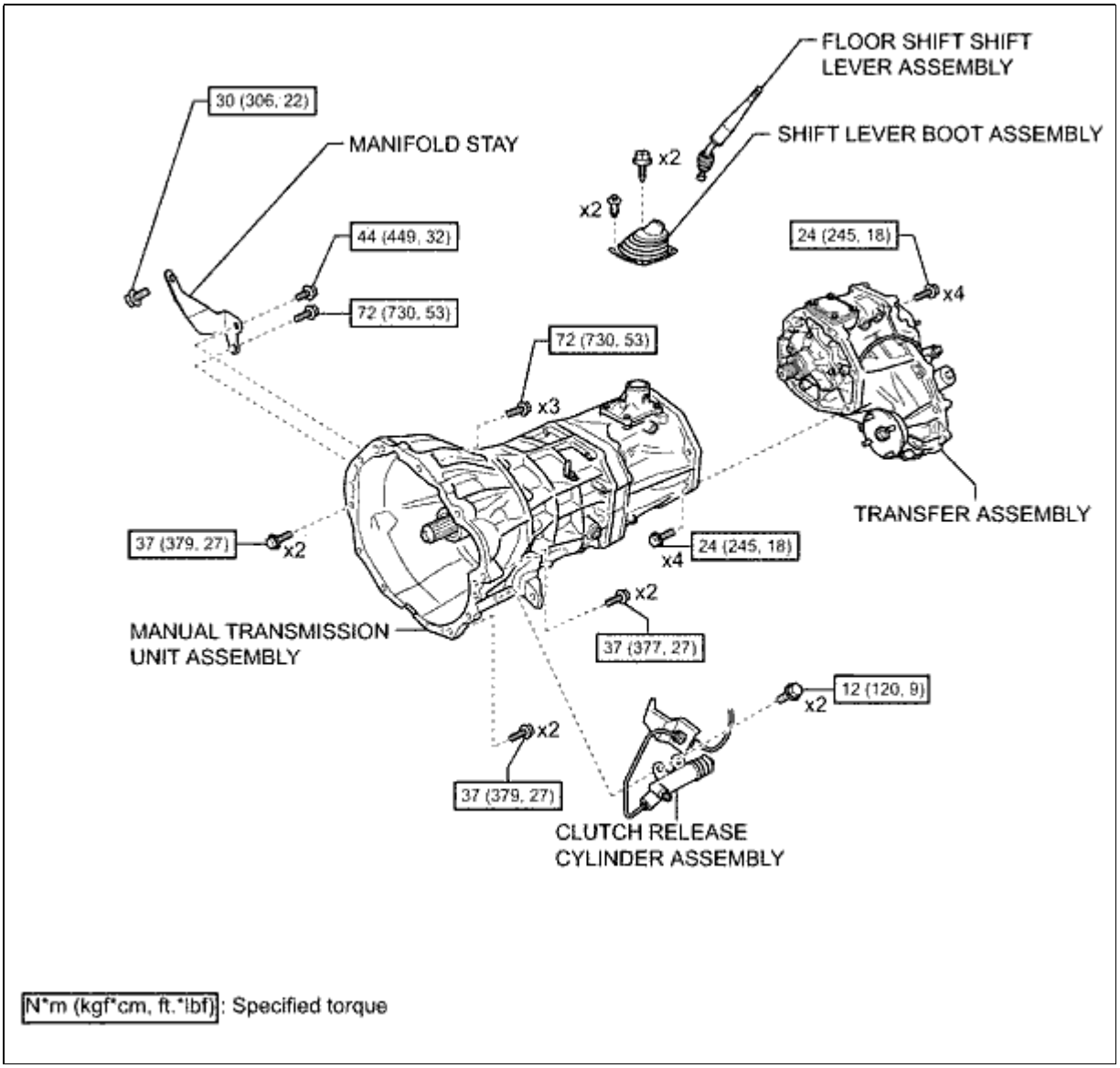
COMPONENTS

ILLUSTRATION



ILLUSTRATION

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177000AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION ASSEMBLY: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

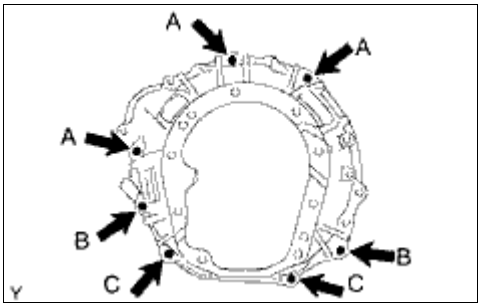
INSTALLATION

1. INSTALL TRANSFER ASSEMBLY INFO

2. INSTALL MANUAL TRANSMISSION WITH TRANSFER

(a) Align the input shaft with the clutch disc and install the manual transmission with transfer to the engine.

(b) Install the 7 bolts.



Torque:

Bolt A -

72 N·m {730 kgf·cm, 53ft·lbf}

Bolt B and Bolt C -

37 N·m {379 kgf·cm, 27ft·lbf}

HINT:

Install bolt B from the front of the vehicle direction.

3. CONNECT WIRE HARNESS

(a) Connect the wire harness clamp to the transmission with transfer assembly.

(b) Connect the back-up light switch connector.

(c) Connect the speed sensor connector.

(d) Connect the 2 transfer indicator switch connectors.

(e) Connect the transfer shift actuator motor connector.

4. INSTALL REAR NO. 1 ENGINE MOUNTING INSULATOR

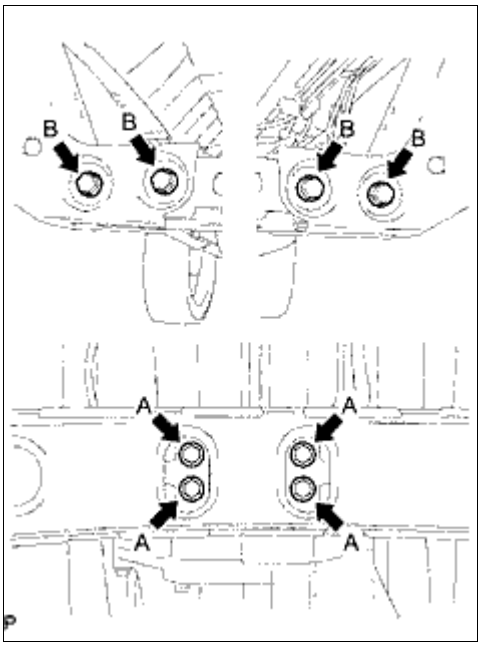
(a) Install the rear No. 1 engine mount insulator to the transmission assembly with 4 bolts.

Torque:

58 N·m {591 kgf·cm, 43ft·lbf}

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5. INSTALL NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY



(a) Install the No. 3 frame crossmember sub-assembly with the 4 bolts B and 4 nuts.

Torque:

40 N·m {408 kgf·cm, 30ft·lbf}

(b) Install the 4 bolts A to the rear No. 1 engine mounting insulator.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

6. REMOVE FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Install the front suspension member bracket LH and front suspension member bracket RH to the No. 3 frame crossmember sub-assembly and vehicle body with the 8 bolts.

Torque:

33 N·m {337 kgf·cm, 24ft·lbf}

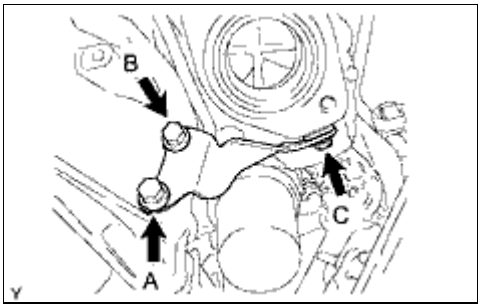
7. INSTALL CLUTCH RELEASE CYLINDER ASSEMBLY

(a) Install the clutch release cylinder assembly with the 2 bolts.

Torque:

12 N·m {120 kgf·cm, 9ft·lbf}

8. INSTALL MANIFOLD STAY



(a) Install the manifold stay with the 3 bolts.

Torque:

Bolt A -

72 N·m {730 kgf·cm, 53ft·lbf}

Bolt B -

44 N·m {449 kgf·cm, 32ft·lbf} for bolt B

Bolt C -

30 N·m {306 kgf·cm, 22ft·lbf} for bolt C

9. INSTALL STARTER ASSEMBLY

INFO

10. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

11. INSTALL FRONT PROPELLER SHAFT ASSEMBLY

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INFO

12. INSTALL FRONT EXHAUST PIPE ASSEMBLY INFO

13. ADD MANUAL TRANSMISSION OIL INFO

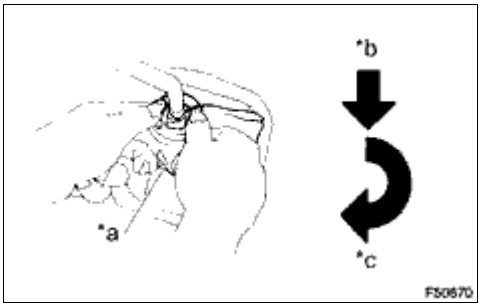
14. ADJUST MANUAL TRANSMISSION OIL INFO

15. INSTALL FLOOR SHIFT SHIFT LEVER ASSEMBLY

(a) Cover the shift lever cap with a cloth.

Text in Illustration

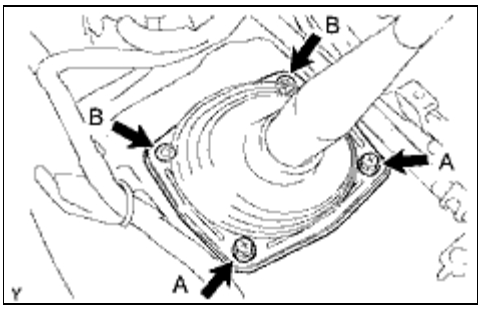
*a	Cloth
*b	Down
*c	Clockwise



(b) While pressing down on the shift lever cap, turn it clockwise to install.

HINT:

Apply MP grease to the tip of the shift lever.



16. INSTALL SHIFT LEVER BOOT ASSEMBLY

(a) Install the shift lever boot assembly with the 2 screws A and 2 clips B.

17. INSTALL FRONT CONSOLE BOX

INFO

18. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

19. INSPECT FOR MANUAL TRANSMISSION OIL LEAK

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177200AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION ASSEMBLY: REMOVAL; 2016 MY Tacoma [08/2015 -]		

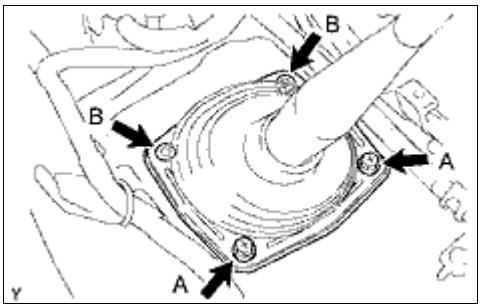
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. REMOVE FRONT CONSOLE BOX

INFO

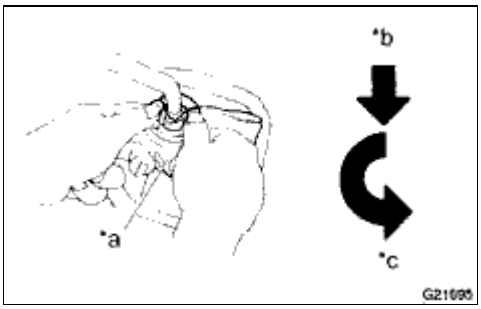
3. REMOVE SHIFT LEVER BOOT ASSEMBLY



(a) Remove the 2 screws A, 2 clips B and shift lever boot assembly.

4. REMOVE FLOOR SHIFT SHIFT LEVER ASSEMBLY

(a) Cover the shift lever cap with a cloth.



Text in Illustration

*a	Cloth
*b	Down
*c	Counterclockwise

(b) While pressing down on the shift lever cap, turn it counterclockwise to remove.

(c) Pull out the shift lever.

5. DRAIN MANUAL TRANSMISSION OIL

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}

6. REMOVE FRONT EXHAUST PIPE ASSEMBLY INFO

7. REMOVE FRONT PROPELLER SHAFT ASSEMBLY

INFO

8. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

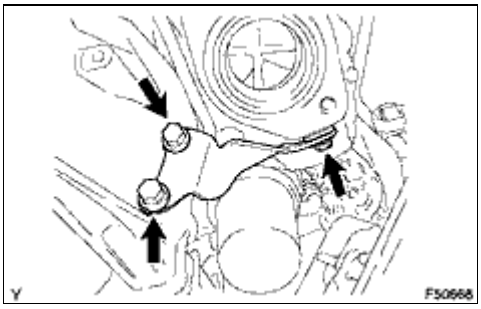
9. REMOVE STARTER ASSEMBLY

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INFO

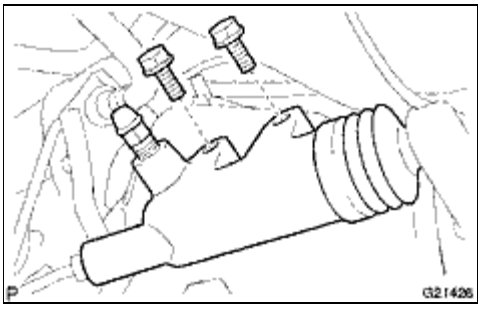
10. REMOVE MANIFOLD STAY

(a) Remove the 3 bolts and manifold stay.



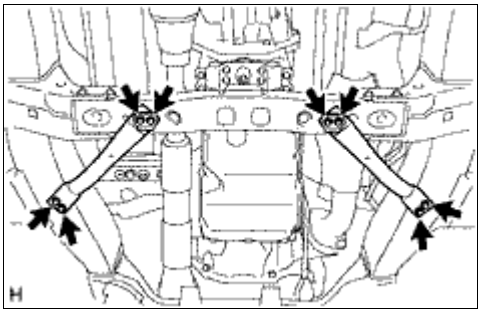
11. SEPARATE CLUTCH RELEASE CYLINDER ASSEMBLY

(a) Remove the 2 bolts to separate the clutch release cylinder assembly.

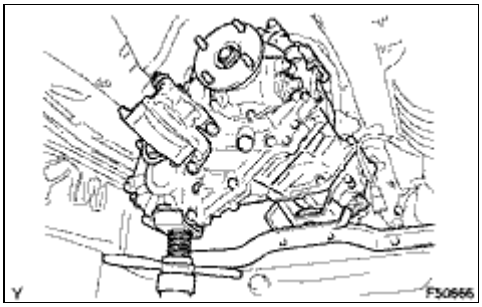


12. REMOVE FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Remove the 8 bolts, front suspension member bracket LH and front suspension member bracket RH from the No. 3 frame crossmember sub-assembly and vehicle body.



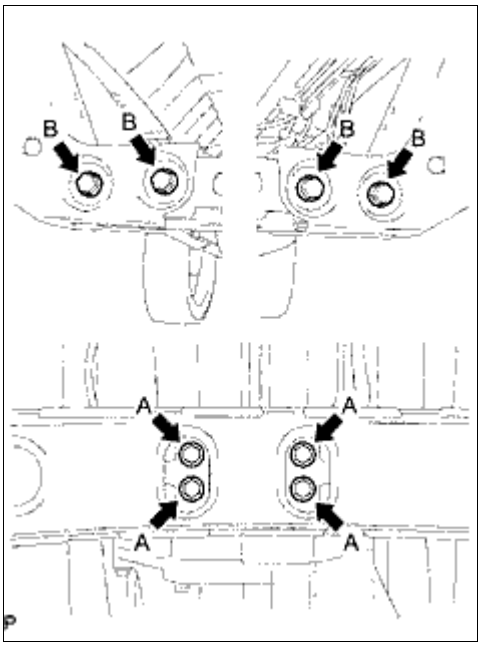
13. REMOVE NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY



(a) Support the transfer with a support stand.

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(b) Remove the 4 bolts A from the rear No. 1 engine mounting insulator.



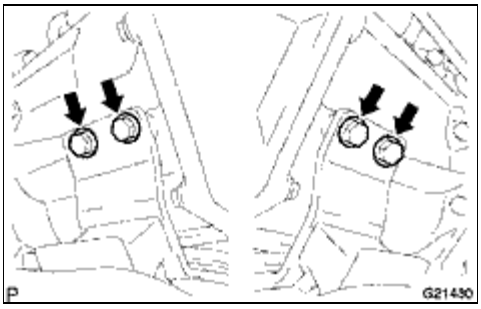
(c) Remove the 4 bolts B, 4 nuts and No. 3 frame crossmember sub-assembly.

14. REMOVE REAR NO. 1 ENGINE MOUNTING INSULATOR

(a) Remove the 4 bolts and rear No. 1 engine mounting insulator.

(b) Using a transmission jack, support the transmission unit assembly.

(c) Remove the support stand from the rear side of the transfer.



15. DISCONNECT WIRE HARNESS

(a) Tilt the transmission assembly downward.

NOTICE:

Make sure that the cooling fan does not come in contact with the fan shroud.

(b) Disconnect the back-up light switch connector.

(c) Disconnect the speed sensor connector.

(d) Disconnect the 2 transfer indicator switch connectors.

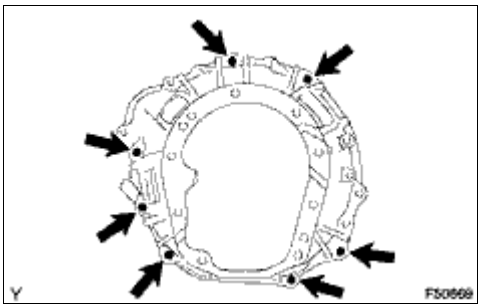
(e) Disconnect the transfer shift actuator motor connector.

(f) Disconnect the wire harness clamp from the transmission with transfer assembly.

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16. REMOVE MANUAL TRANSMISSION WITH TRANSFER

(a) Remove the 7 bolts and manual transmission with transfer.



17. REMOVE TRANSFER ASSEMBLY INFO

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM00000176Z00AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION OIL: ON-VEHICLE INSPECTION; 2016 MY Tacoma [08/2015 -]		

ON-VEHICLE INSPECTION

1. INSPECT TRANSMISSION OIL

(a) Park the vehicle in a level place.

(b) Remove the transmission filler plug and gasket.

(c) Check that the oil surface is within 5 mm (0.20 in.) of the lowest point of the transmission filler plug opening.

Manual Transmission Oil:

Oil Grade

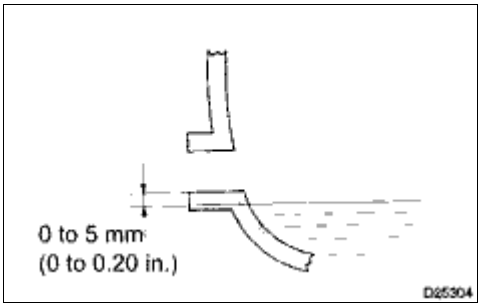
API GL-4

Viscosity

SAE 75W-90

Standard Capacity

2.2 Liters (2.3 US qts, 1.9 Imp. qts)



NOTICE:

- Problems may occur when the oil level is too high or low.
- After replacing the oil, drive the vehicle and check the oil level again.

(d) Check for oil leakage when the oil level is low.

(e) Install the transmission filler plug and a new gasket.

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}

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Last Modified: 11-13-2015	6.6 T	**Doc ID:** RM0000177I00AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: PROBLEM SYMPTOMS TABLE; 2016 MY Tacoma [08/2015 -]		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

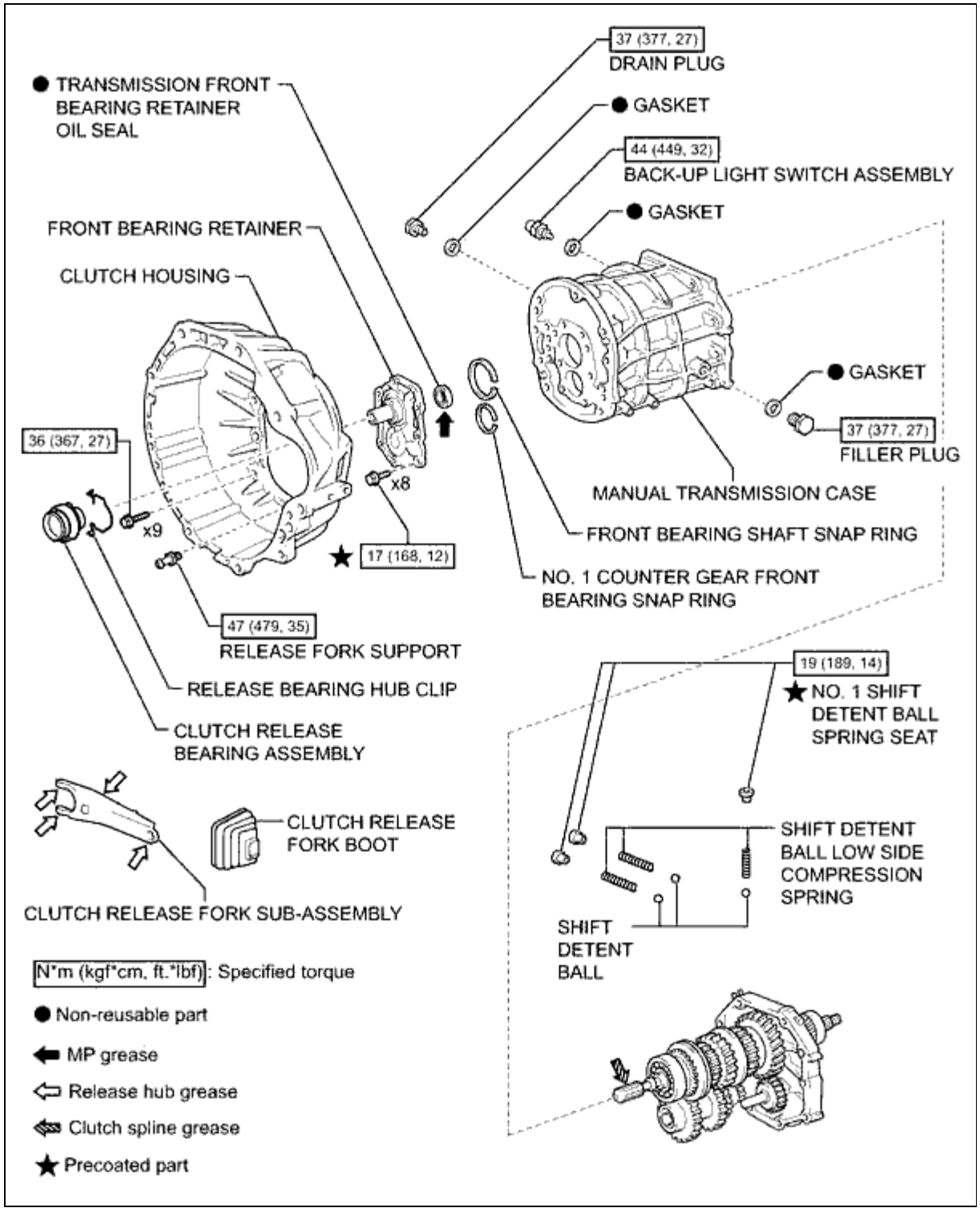
SYMPTOM	SUSPECTED AREA	SEE PAGE
Abnormal noise	Oil level (Low)	INFO
	Oil (Wrong)	INFO
	Gears (Worn or damaged)	-
	Bearings (Worn or damaged)	-
Oil leakage	Oil level (High)	INFO
	Gasket (Damaged)	-
	Oil seal (Worn or damaged)	-
	O-ing (Worn or damaged)	-
Hard shifting or will not shift	Synchronizer ring (Worn or damaged)	-
	Shift key spring (Damaged)	-
Jumps out of gear	Locking ball spring (Damaged)	-
	Shift fork (Worn)	-
	Gears (Worn or damaged)	-
	Bearings (Worn or damaged)	-

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005LKN002X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

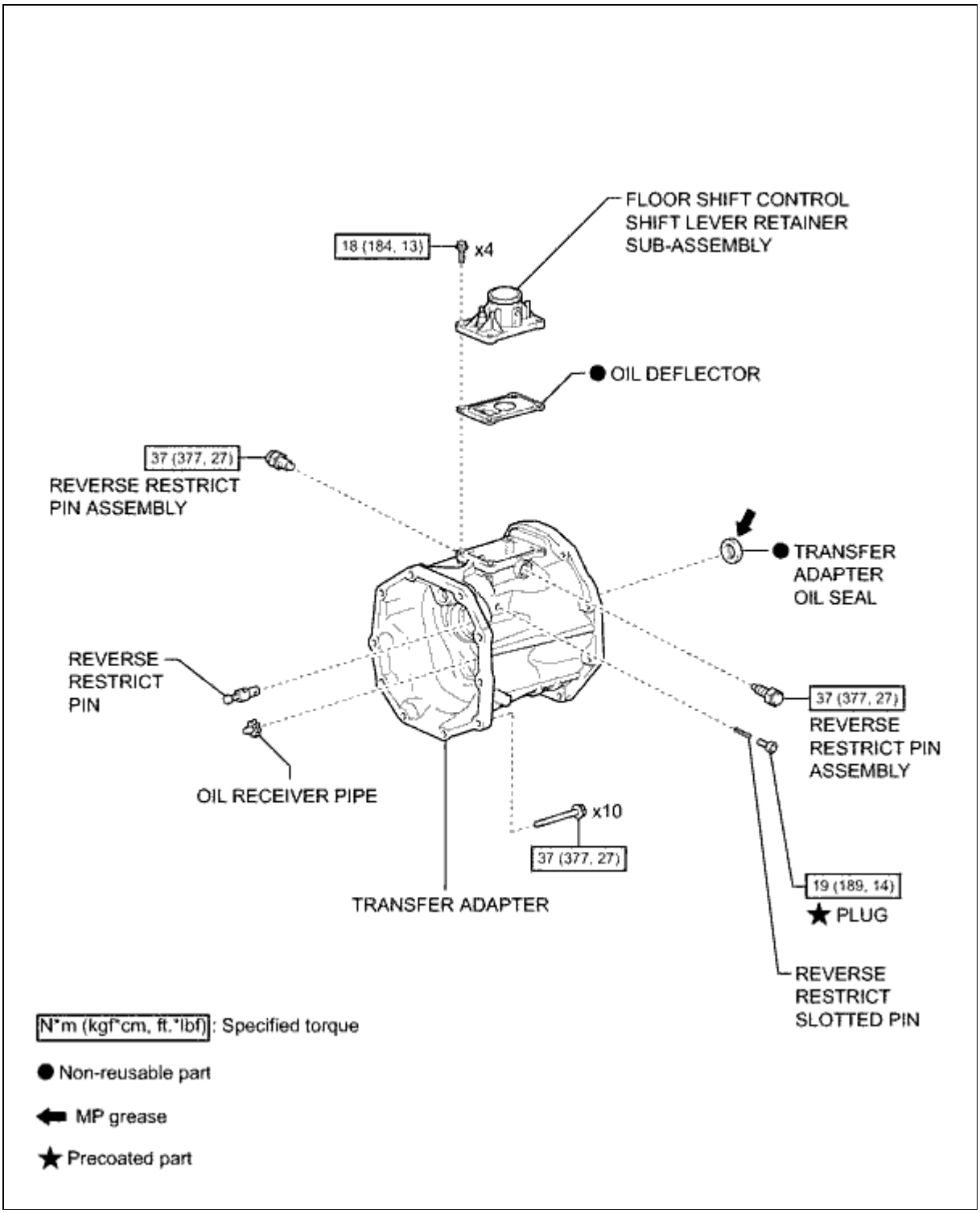
COMPONENTS

ILLUSTRATION



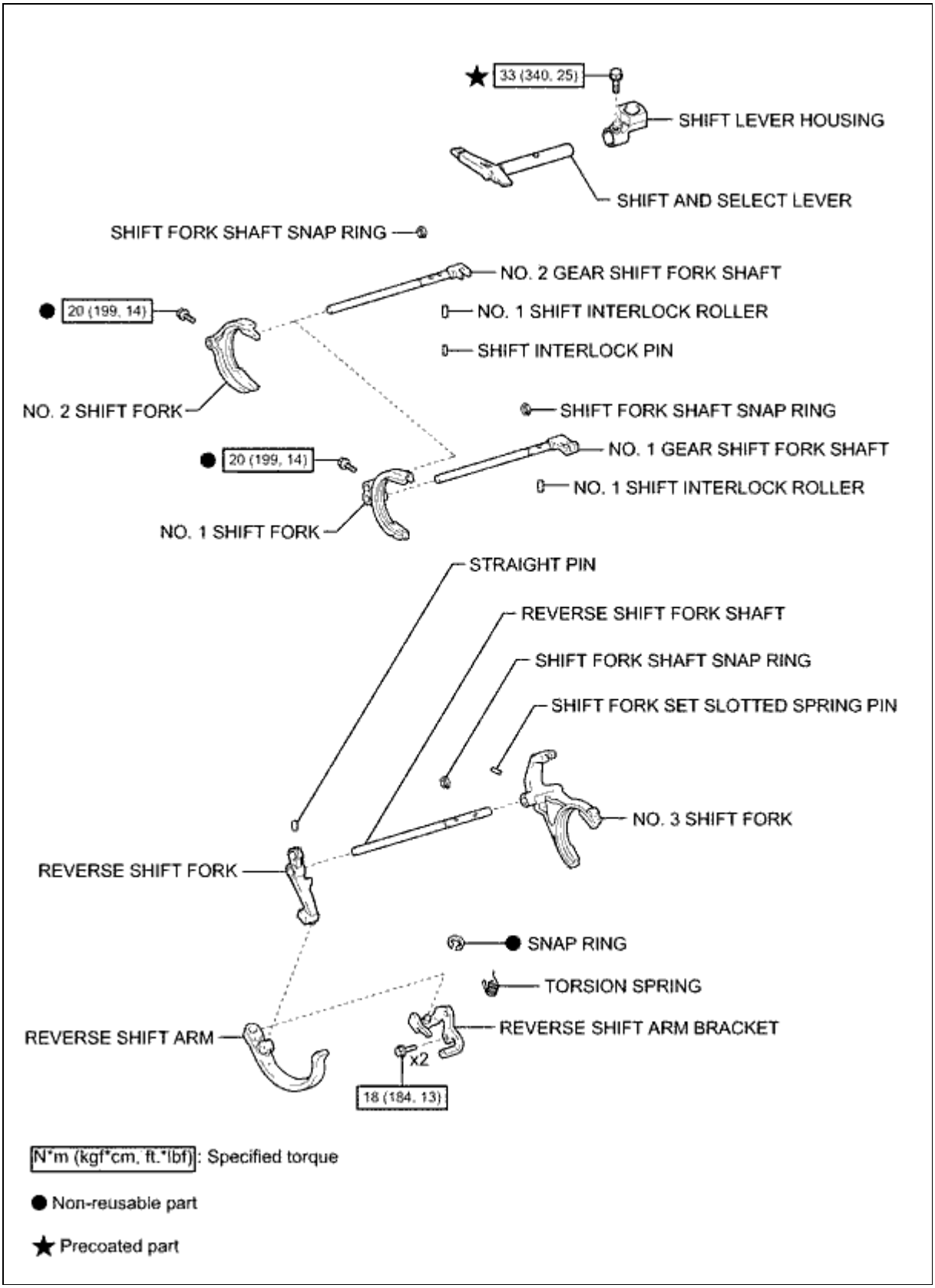
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ILLUSTRATION



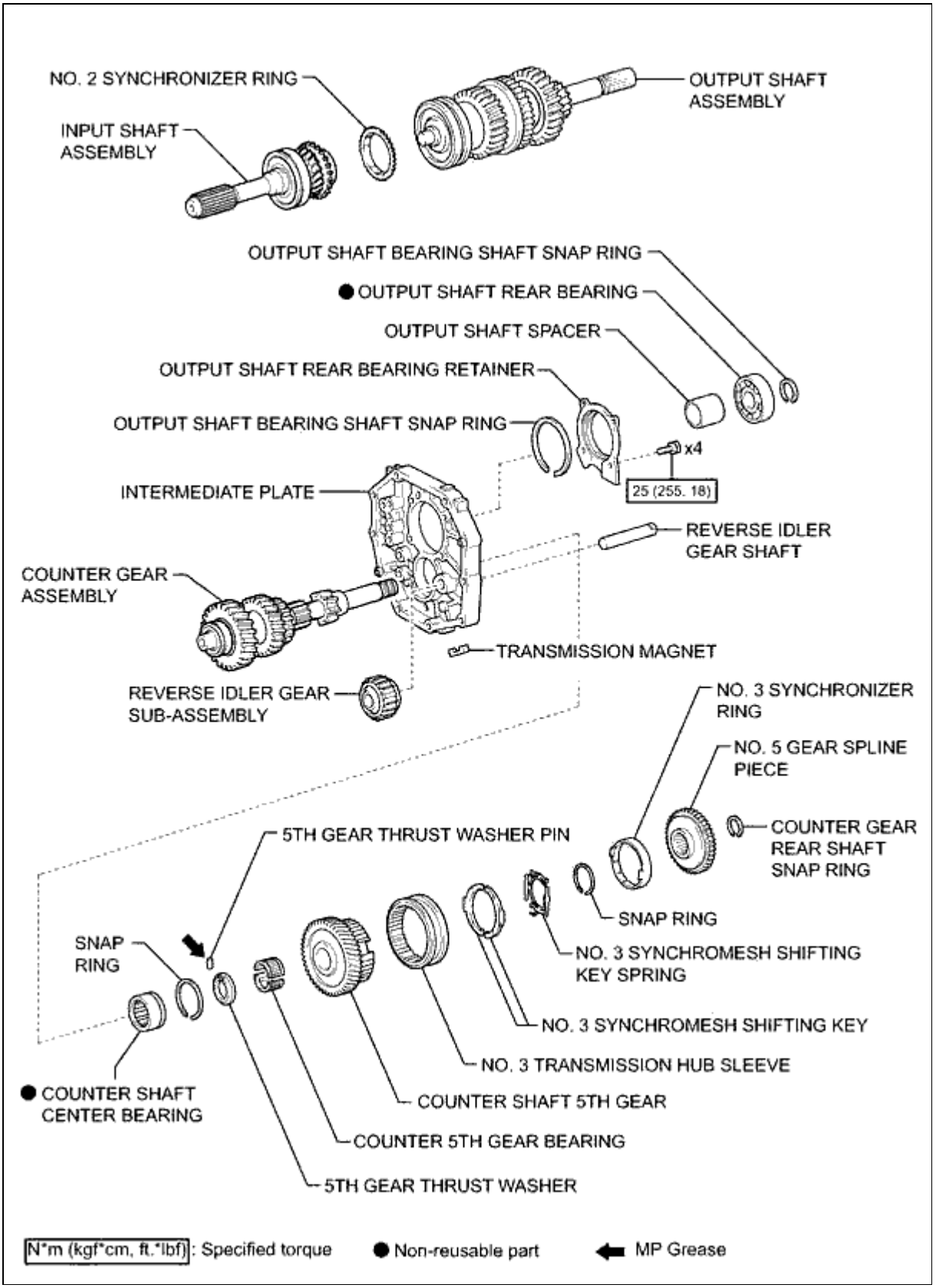
ILLUSTRATION

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ILLUSTRATION

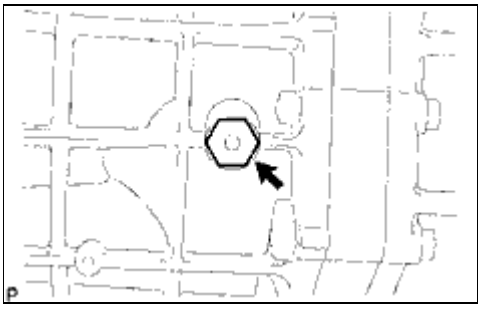
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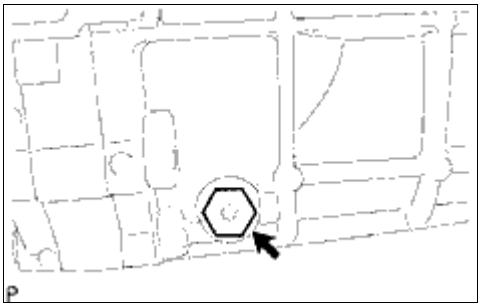
Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176K00HX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY



1. REMOVE FILLER PLUG

(a) Remove the filler plug and gasket from the manual transmission case.



2. REMOVE DRAIN PLUG

(a) Remove the drain plug and gasket from the manual transmission case.

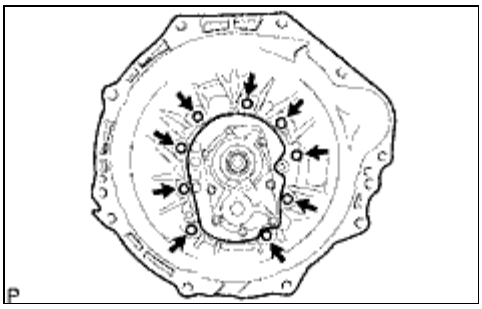
3. REMOVE CLUTCH RELEASE FORK SUB-ASSEMBLY INFO

4. REMOVE CLUTCH RELEASE BEARING ASSEMBLY INFO

5. REMOVE RELEASE FORK SUPPORT INFO

6. REMOVE CLUTCH RELEASE FORK BOOT

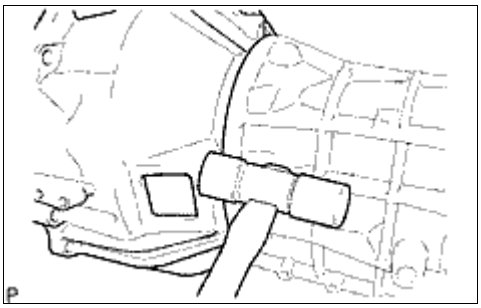
7. REMOVE CLUTCH HOUSING



(a) Remove the 9 bolts.

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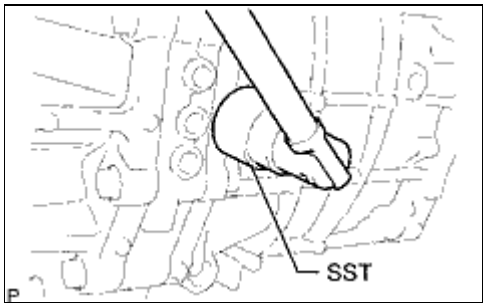
(b) Using a plastic hammer, remove the clutch housing from the manual transmission case.



8. REMOVE BACK-UP LIGHT SWITCH ASSEMBLY

(a) Using SST, remove the back-up light switch assembly and gasket from the manual transmission case.

SST: 09817-16011

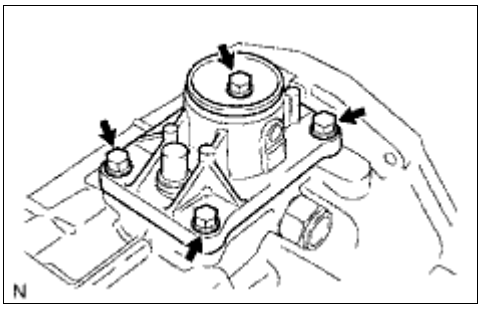


9. REMOVE FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY

(a) Remove the 4 bolts.

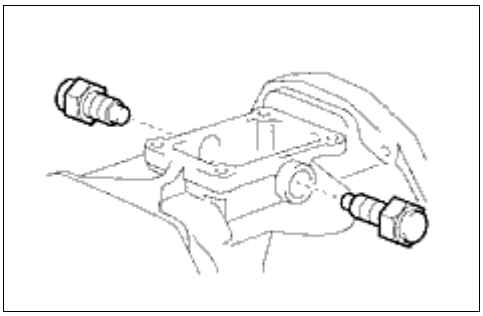
(b) Remove the floor shift control shift lever retainer sub-assembly from the transfer adapter.

(c) Remove the oil deflector from the transfer adapter.

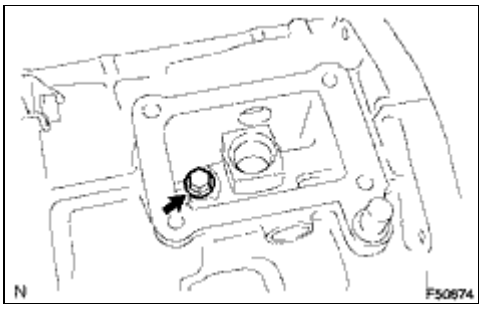


10. REMOVE REVERSE RESTRICT PIN ASSEMBLY

(a) Remove the 2 reverse restrict pin assemblies from the transfer adapter.



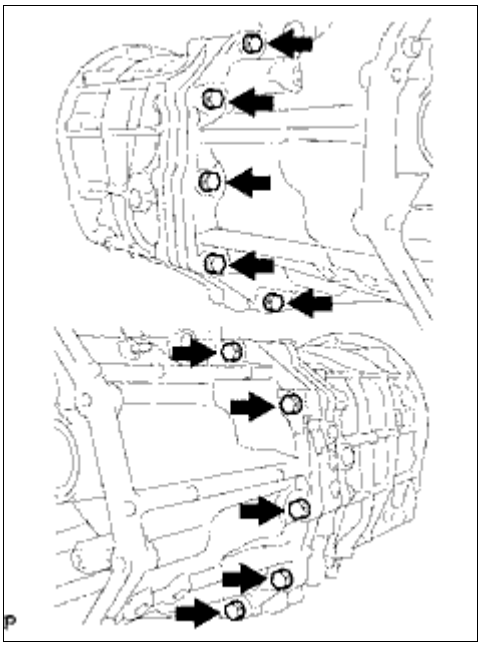
11. REMOVE TRANSFER ADAPTER



(a) Remove the bolt from the shift lever housing.

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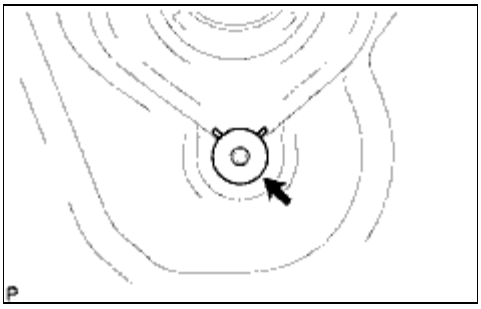
(b) Remove the 10 bolts.



(c) Using a plastic hammer, remove the transfer adapter, shift lever housing and the shift and select lever.

12. REMOVE OIL RECEIVER PIPE

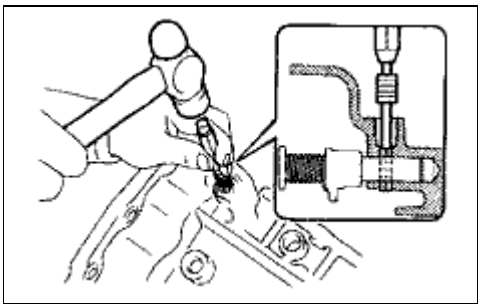
(a) Remove the oil receiver pipe from the transfer adapter.



13. REMOVE REVERSE RESTRICT PIN

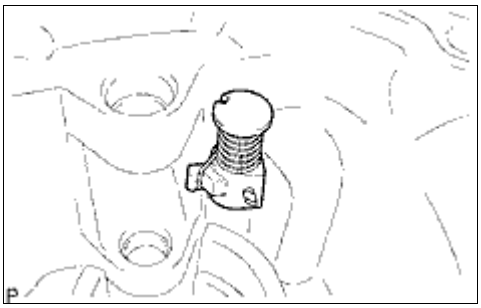
(a) Using a T40 "TORX" socket wrench, remove the plug from the transfer adapter.

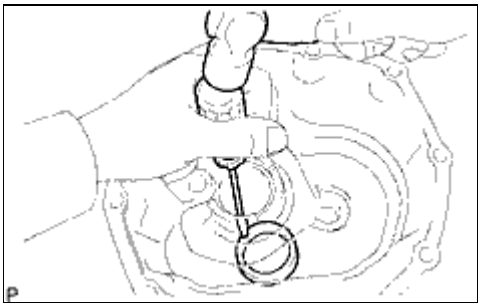
(b) Using a 5 mm pin punch and a hammer, remove the reverse restrict slotted pin from the transfer adapter.



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(c) Remove the reverse restrict pin from the transfer adapter.

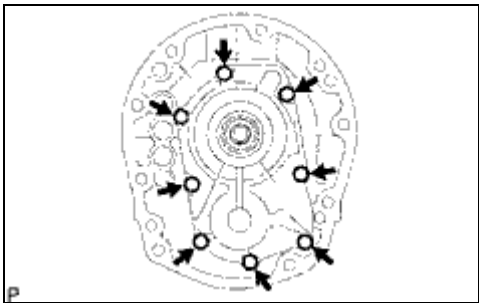




14. REMOVE TRANSFER ADAPTER OIL SEAL

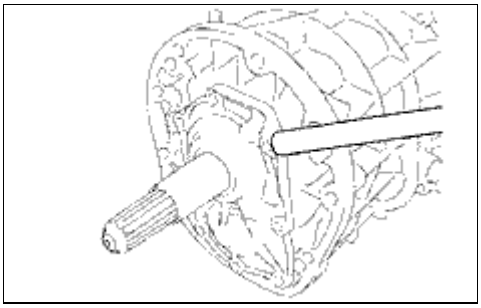
(a) Using a screwdriver and a hammer, remove the transfer adapter oil seal from the transfer adapter.

15. REMOVE FRONT BEARING RETAINER



(a) Remove the 8 bolts.

(b) Using a brass bar and a hammer, remove the front bearing retainer from the manual transmission case.



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16. REMOVE TRANSMISSION FRONT BEARING RETAINER OIL SEAL

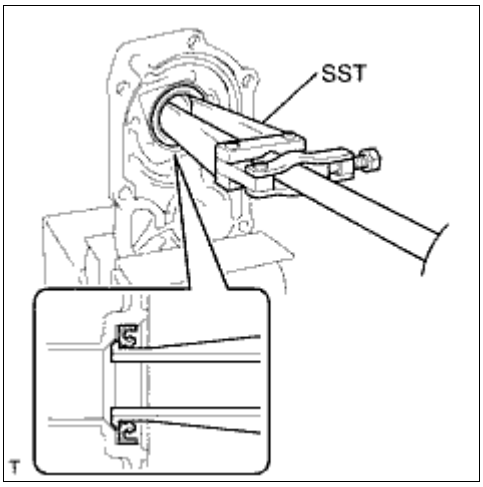
(a) Fix the front bearing retainer in a vise between aluminum plates.

NOTICE:

Do not overtighten the vise.

(b) Using SST, remove the transmission front bearing retainer oil seal from the front bearing retainer.

SST: 09308-00010

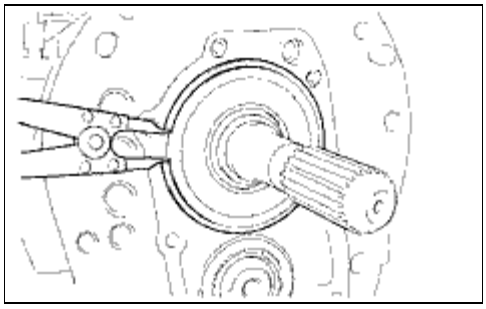


17. REMOVE FRONT BEARING SHAFT SNAP RING

(a) Using a snap ring expander, remove the front bearing shaft snap ring from the input shaft front bearing.

NOTICE:

Use a piece of cloth to prevent the front bearing shaft snap ring from flying off.

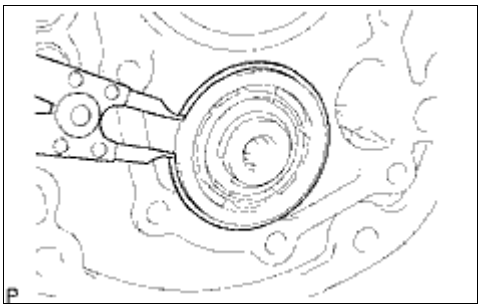


18. REMOVE NO. 1 COUNTER GEAR FRONT BEARING SNAP RING

(a) Using a snap ring expander, remove the No. 1 counter gear front bearing snap ring from the counter gear front bearing.

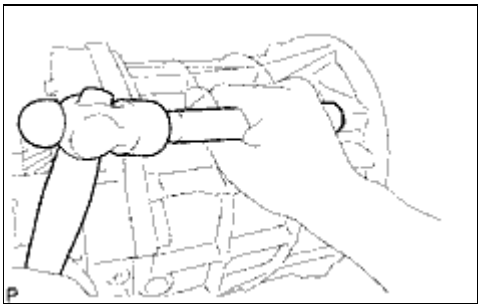
NOTICE:

Use a piece of cloth to prevent the No. 1 counter gear front bearing snap ring from flying off.



19. REMOVE MANUAL TRANSMISSION CASE

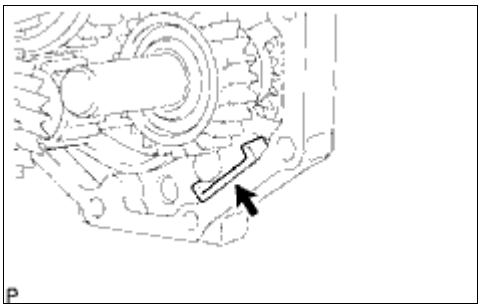
(a) Using a brass bar and a hammer, remove the manual transmission case from the intermediate plate.



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20. REMOVE TRANSMISSION MAGNET

(a) Remove the transmission magnet from the intermediate plate.

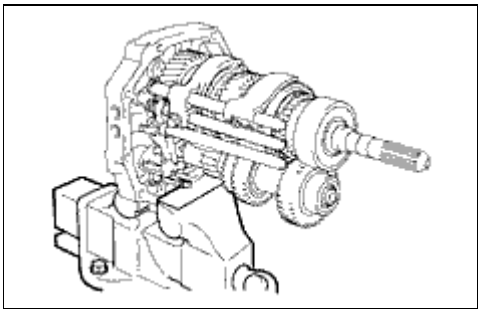


21. FIX INTERMEDIATE PLATE

(a) Fix the intermediate plate in a vise between aluminum plates.

NOTICE:

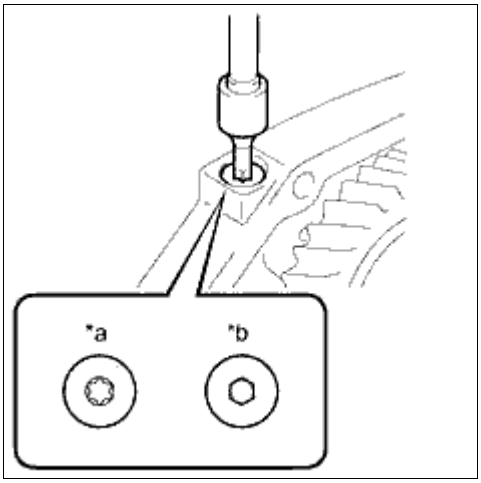
Do not overtighten the vise.



22. REMOVE NO. 1 SHIFT DETENT BALL SPRING SEAT

(a) for Type A:

Using a T40 "TORX" socket wrench, remove the No.1 shift detent ball plug spring seat from the intermediate plate.



(b) for Type B:

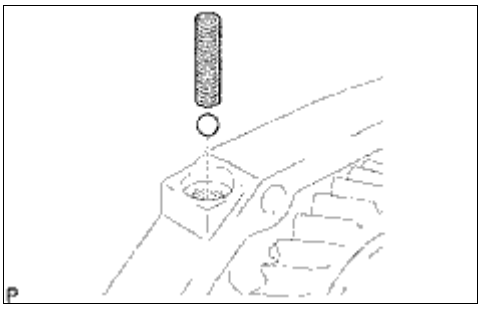
Using a 6 mm hexagon socket wrench, remove the No.1 shift detent ball plug spring seat from the intermediate plate.

Text in Illustration

*a	for Type A
*b	for Type B

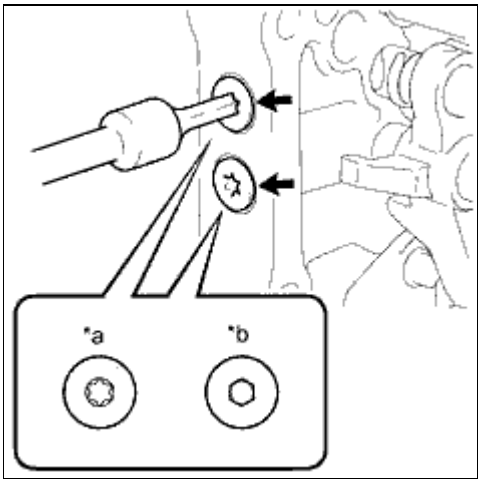
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(c) Using a magnet hand, remove the shift detent ball low side compression spring and the shift detent ball from the intermediate plate.



(d) for Type A:

Using a T40 "TORX" socket wrench, remove the 2 No. 1 shift detent ball spring seat from the intermediate plate.



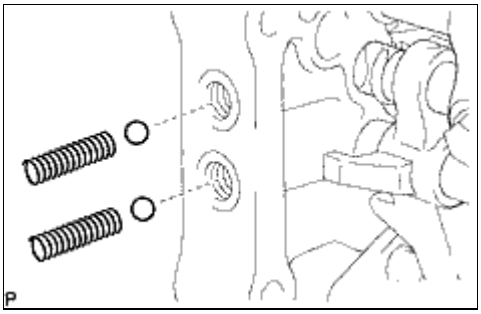
(e) for Type B:

Using a 6 mm hexagon socket wrench, remove the 2 No.1 shift detent ball plug spring seat from the intermediate plate.

Text in Illustration

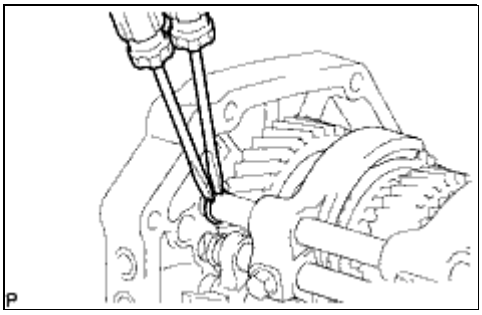
*a	for Type A
*b	for Type B

(f) Using a magnet hand, remove the 2 shift detent ball low side compression springs and the 2 shift detent balls from the intermediate plate.



23. REMOVE NO. 2 GEAR SHIFT FORK SHAFT

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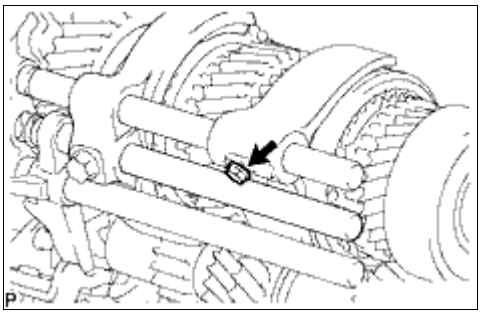


(a) Using 2 screwdrivers and a hammer, remove the shift fork shaft snap ring from the No. 2 gear shift fork shaft.

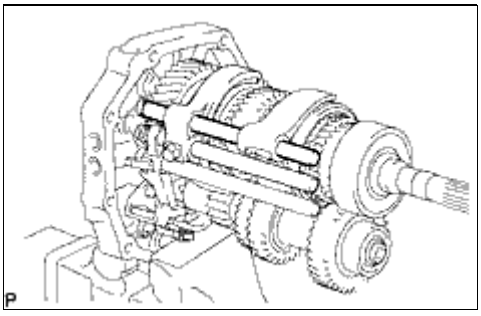
NOTICE:

Use a piece of cloth to prevent the shift fork shaft snap ring from flying off.

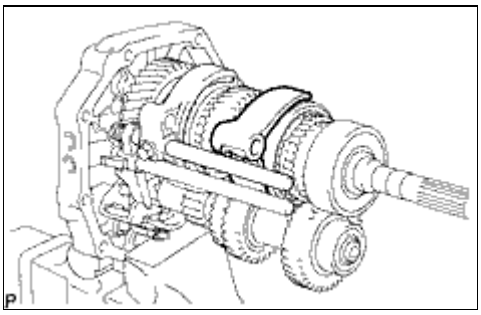
(b) Remove the bolt from the No. 2 shift fork.



(c) Remove the No. 2 gear shift fork shaft from the intermediate plate.

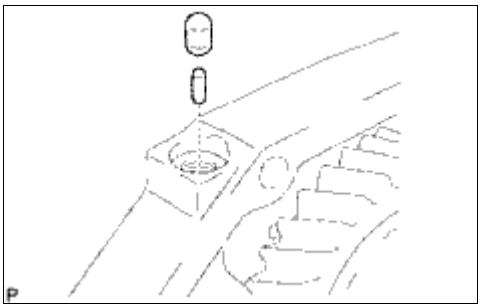


(d) Remove the No. 2 shift fork from the No. 2 transmission hub sleeve.

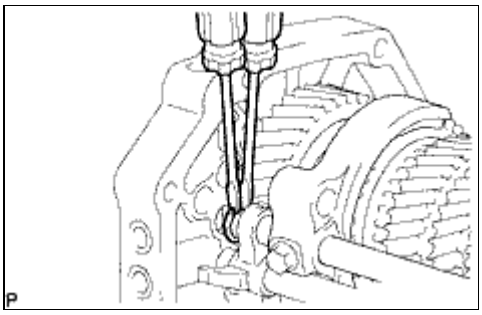


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(e) Using a magnet hand, remove the No. 1 shift interlock roller and the shift interlock pin from the intermediate plate.



24. REMOVE NO. 1 GEAR SHIFT FORK SHAFT

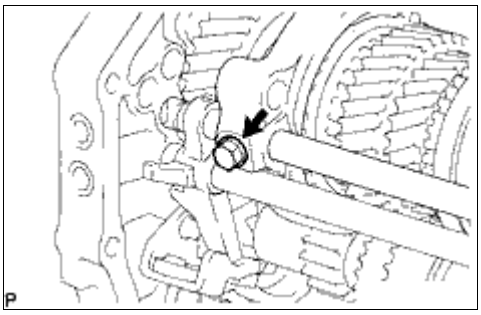


(a) Using 2 screwdrivers and a hammer, remove the shift fork shaft snap ring from the No. 1 gear shift fork shaft.

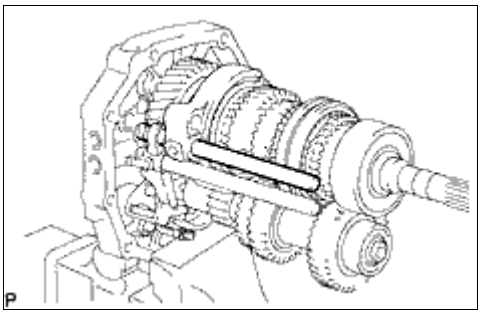
NOTICE:

Use a piece of cloth to prevent the shift fork shaft snap ring from flying off.

(b) Remove the bolt from the No. 1 shift fork.

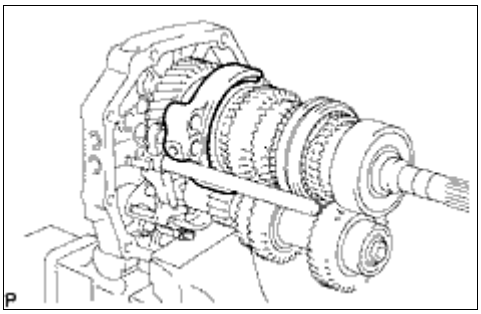


(c) Remove the No. 1 gear shift fork shaft from the intermediate plate.

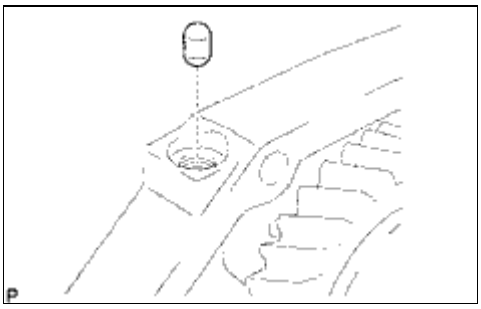


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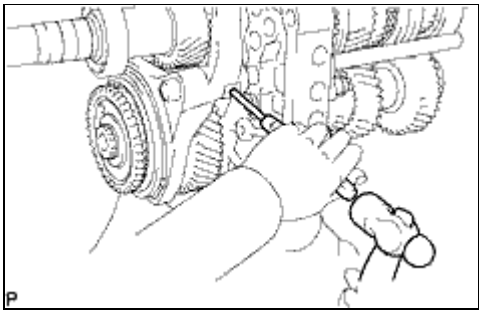
(d) Remove the No. 1 shift fork from the reverse gear.



(e) Using a magnet hand, remove the No. 1 shift interlock roller from the intermediate plate.



25. REMOVE REVERSE SHIFT FORK SHAFT

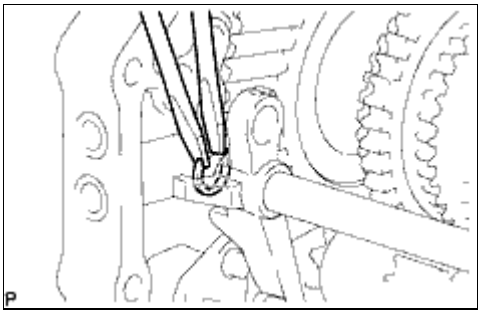


(a) Using a 5 mm pin punch and a hammer, remove the shift fork set slotted spring pin from the No. 3 shift fork.

(b) Using 2 screwdrivers and a hammer, remove the shift fork shaft snap ring from the reverse shift fork shaft.

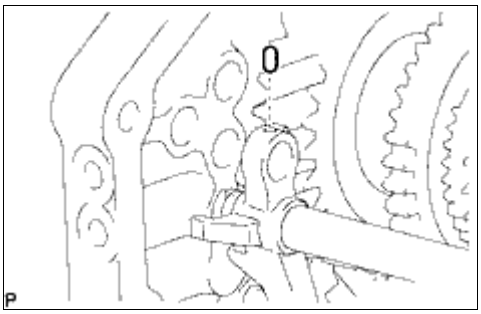
NOTICE:

Use a piece of cloth to prevent the shift fork shaft snap ring from flying off.

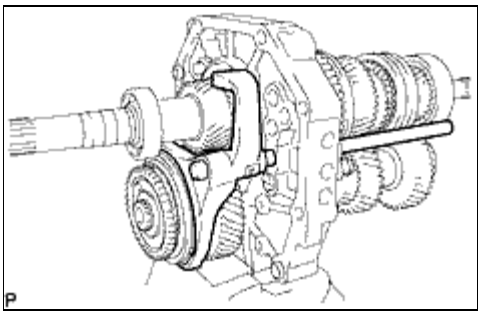


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(c) Using a magnet hand, remove the straight pin from the reverse shift fork.

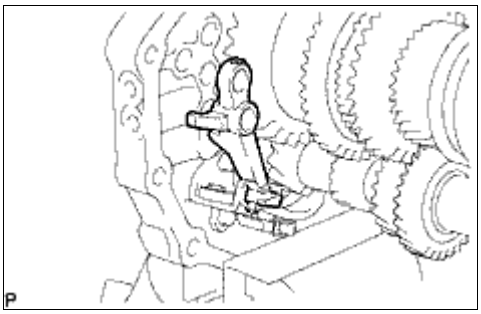


(d) Remove the No. 3 shift fork and the reverse shift fork shaft from the intermediate plate.

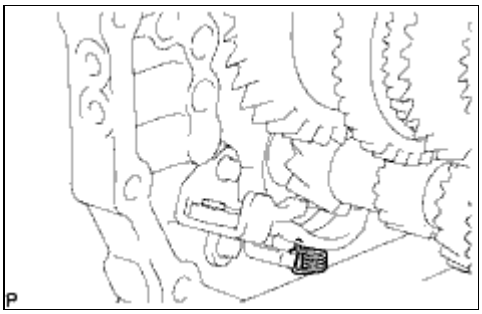


26. REMOVE REVERSE SHIFT FORK

(a) Remove the reverse shift fork from the reverse shift arm.

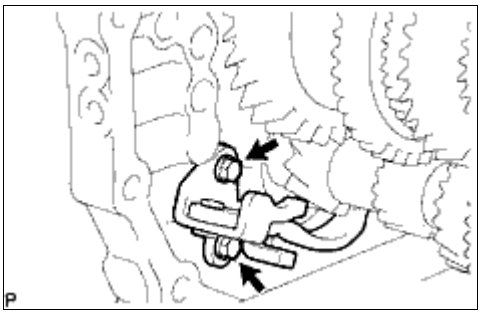


27. REMOVE REVERSE SHIFT ARM BRACKET



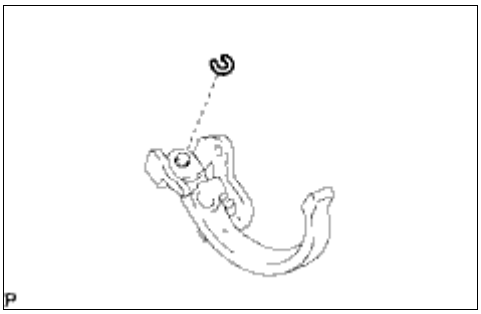
(a) Remove the torsion spring from the reverse shift arm bracket.

(b) Remove the 2 bolts and the reverse shift arm bracket from the intermediate plate.



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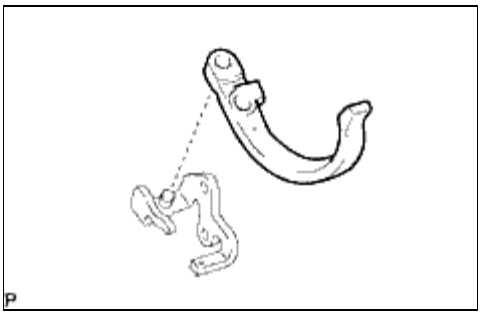
(c) Using a screwdriver, pry out the snap ring from the reverse shift arm bracket.



NOTICE:

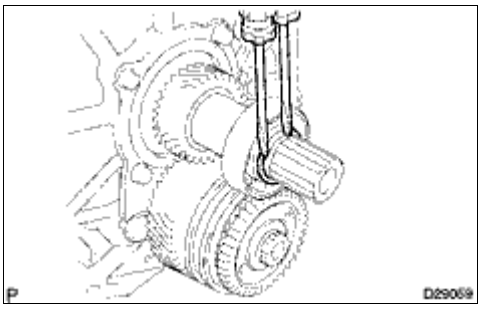
Use a piece of cloth to prevent the snap ring from flying off.

(d) Remove the reverse shift arm from the reverse shift arm bracket.



28. REMOVE OUTPUT SHAFT BEARING SHAFT SNAP RING

(a) Using 2 screwdrivers and a hammer, remove the output shaft bearing shaft snap ring from the output shaft assembly.



NOTICE:

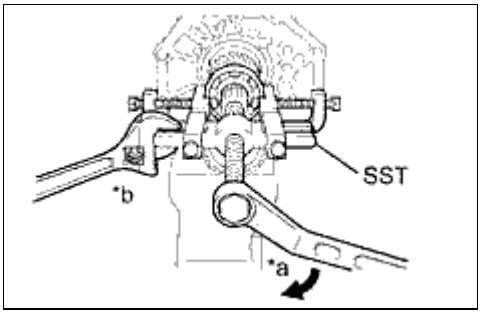
Use a piece of cloth to prevent the output shaft bearing snap ring from flying off.

29. REMOVE OUTPUT SHAFT REAR BEARING

(a) Using SST, remove the output shaft rear bearing and the output shaft spacer from the output shaft assembly.

Text in Illustration

*a	Turn
*b	Hold



SST: 09950-40011

09951-04010
09952-04010
09953-04020
09954-04010
09955-04051
09957-04010
09958-04011

NOTICE:

Apply grease to the threads and tip of the SST center bolt before use.

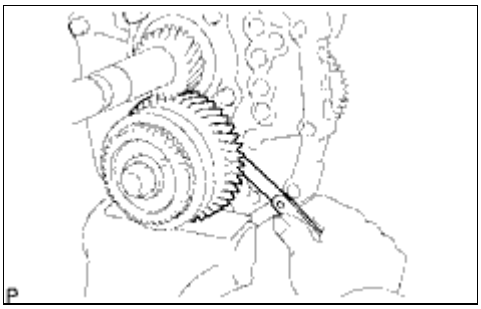
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30. INSPECT COUNTER SHAFT 5TH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the thrust clearance.

Standard clearance:
0.10 to 0.35 mm (0.00394 to 0.0137 in.)

If the clearance is not as specified, replace the counter shaft 5th gear with a new one.

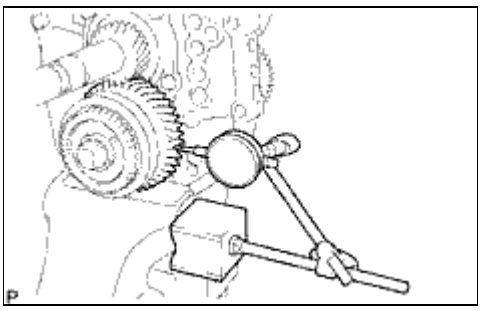


31. INSPECT COUNTER SHAFT 5TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance:
0.015 to 0.068 mm (0.000591 to 0.00267 in.)

If the clearance is not as specified, replace the counter 5th gear bearing with a new one.

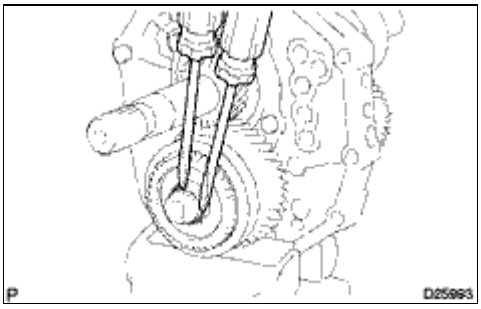


32. REMOVE COUNTER GEAR REAR SHAFT SNAP RING

(a) Using 2 screwdrivers and a hammer, remove the counter gear rear shaft snap ring from the counter gear assembly.

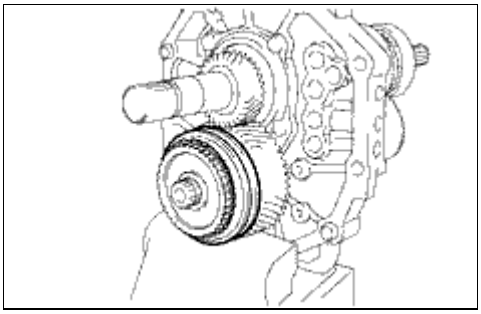
NOTICE:

Use a piece of cloth to prevent the counter gear rear shaft snap ring from flying off.



33. REMOVE NO. 3 TRANSMISSION HUB SLEEVE

(a) Remove the No. 3 transmission hub sleeve from the counter shaft 5th gear.

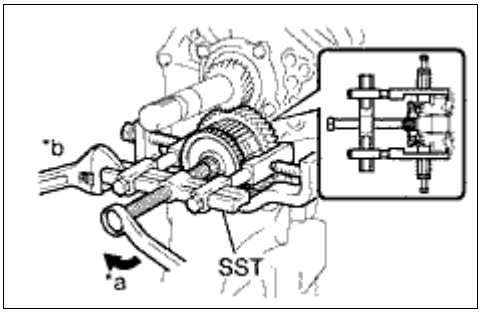


34. REMOVE COUNTER SHAFT 5TH GEAR

(a) Using SST, remove the counter shaft 5th gear together with the 2 No. 3 synchromesh shifting keys, No. 3 synchromesh shifting key spring, No. 3 synchronizer ring and the No. 5 gear spline piece from the counter gear assembly.

Text in Illustration

*a	Turn
*b	Hold



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SST: 09950-40011

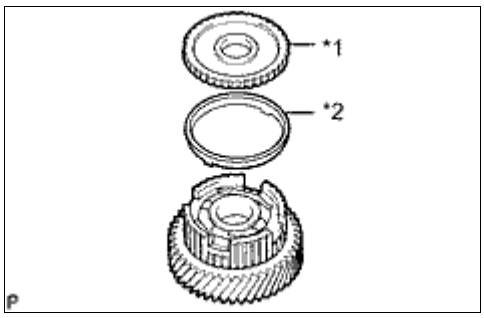
09951-04020
09952-04010
09953-04020
09954-04010
09955-04021
09957-04010
09958-04011

NOTICE:

Apply grease to the threads and tip of the SST center bolt before use.

35. REMOVE NO. 5 GEAR SPLINE PIECE

(a) Remove the No. 5 gear spline piece from the counter shaft 5th gear.



Text in Illustration

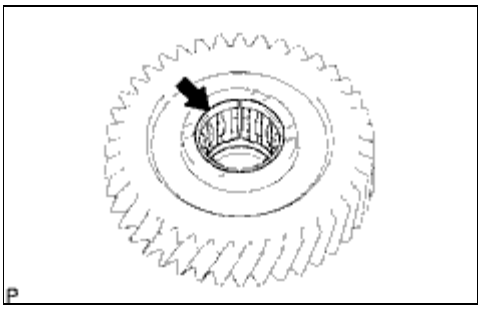
*1	No. 5 Gear Spline Piece
*2	No. 3 Synchronizer Ring

36. REMOVE NO. 3 SYNCHRONIZER RING

(a) Remove the No. 3 synchronizer ring from the counter shaft 5th gear.

37. REMOVE COUNTER 5TH GEAR BEARING

(a) Remove the counter 5th gear bearing from the counter shaft 5th gear.

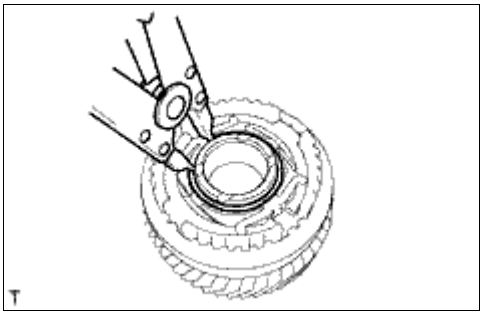


38. REMOVE NO. 3 SYNCHROMESH SHIFTING KEY

(a) Using a snap ring expander, remove the snap ring.

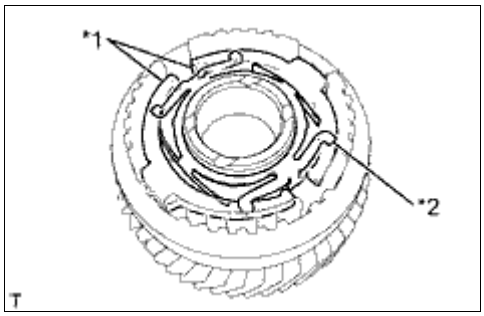
NOTICE:

Use a piece of cloth to prevent the snap ring from flying off.



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(b) Remove the 2 No. 3 synchromesh shifting keys and the No. 3 synchromesh shifting key spring from the counter shaft 5th gear.

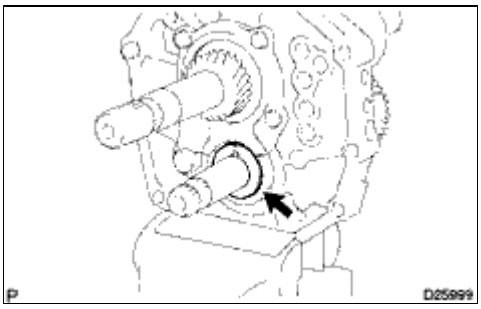


Text in Illustration

*1	No. 3 Synchromesh Shifting Key
*2	No. 3 Synchromesh Shifting Key Spring

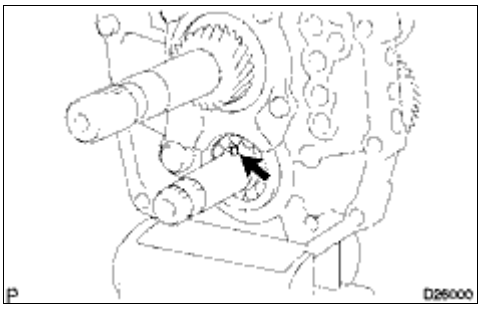
39. REMOVE 5TH GEAR THRUST WASHER

(a) Remove the 5th gear thrust washer from the counter gear assembly.



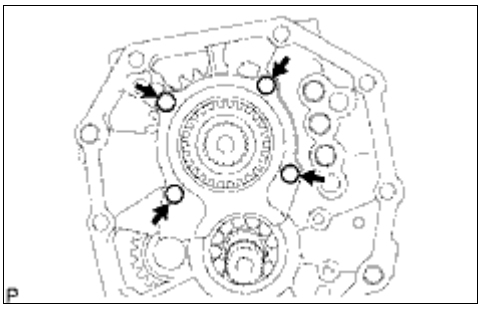
40. REMOVE 5TH GEAR THRUST WASHER PIN

(a) Remove the 5th gear thrust washer pin from the counter gear assembly.



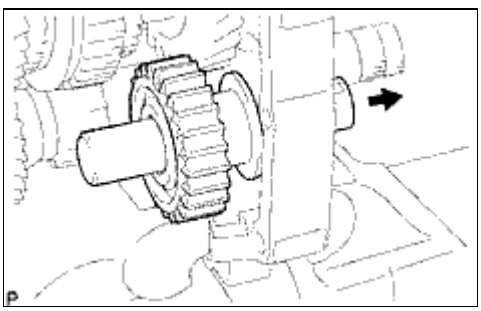
41. REMOVE OUTPUT SHAFT REAR BEARING RETAINER

(a) Remove the 4 bolts and the output shaft rear bearing retainer from the intermediate plate.



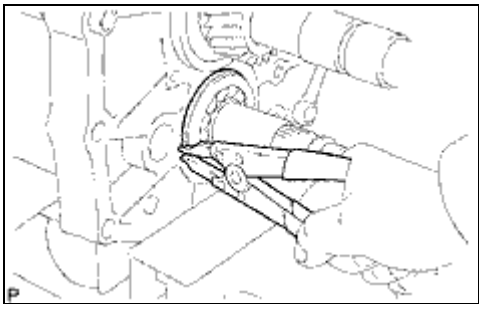
42. REMOVE REVERSE IDLER GEAR SUB-ASSEMBLY

(a) Pull out the reverse idler gear shaft to the rear side and remove the reverse idler gear sub-assembly from the intermediate plate.



43. REMOVE COUNTER SHAFT CENTER BEARING

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(a) Using a snap ring expander, remove the snap ring.

NOTICE:

Use a piece of cloth to prevent the snap ring from flying off.

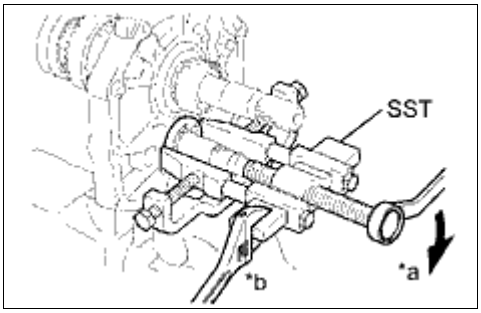
(b) Using SST, remove the counter shaft center bearing from the intermediate plate.

Text in Illustration

*a	Turn
*b	Hold

SST: 09950-40011

09951-04010
09952-04010
09953-04020
09954-04010
09955-04011
09957-04010
09958-04011



NOTICE:

Apply grease to the threads and tip of the SST center bolt before use.

HINT:

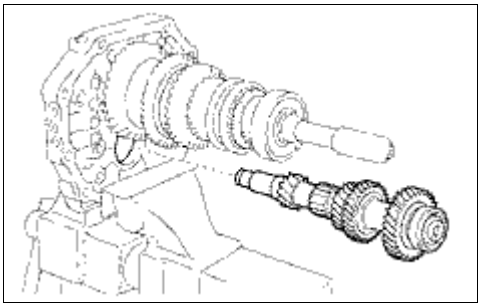
Remove the counter shaft center bearing while tapping the tip of the counter gear so that the counter gear does not hit the side wall of the output shaft gear by being pushed forward.

44. REMOVE COUNTER GEAR ASSEMBLY

(a) Remove the counter gear assembly from the intermediate plate.

NOTICE:

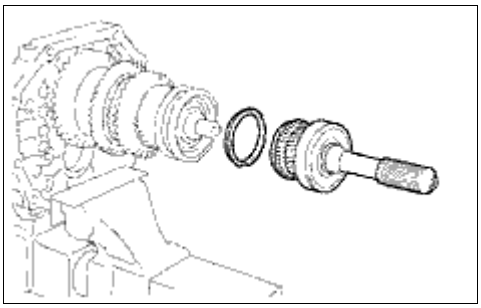
Do not drop the counter gear assembly.



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45. REMOVE INPUT SHAFT ASSEMBLY

(a) Remove the input shaft assembly and the No. 2 synchronizer ring from the output shaft assembly.

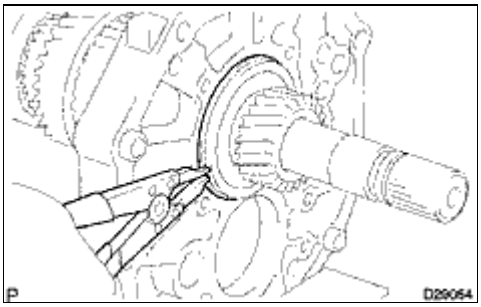


NOTICE:

Do not drop the input shaft assembly and the No. 2 synchronizer ring.

46. REMOVE OUTPUT SHAFT BEARING SHAFT SNAP RING

(a) Using a snap ring expander, remove the output shaft bearing shaft snap ring from the output shaft assembly.

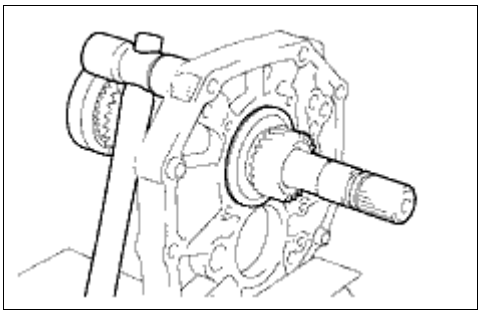


NOTICE:

Use a piece of cloth to prevent the output shaft bearing shaft snap ring from flying off.

47. REMOVE OUTPUT SHAFT ASSEMBLY

(a) Using a plastic hammer, remove the output shaft assembly by tapping the intermediate plate.

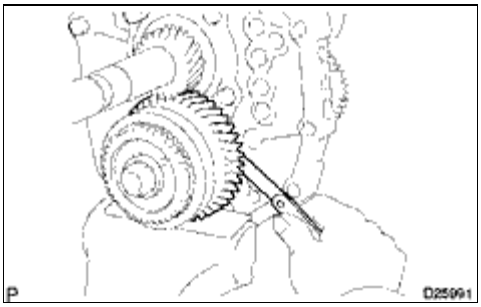


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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM00000176I00HX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT COUNTER SHAFT 5TH GEAR THRUST CLEARANCE

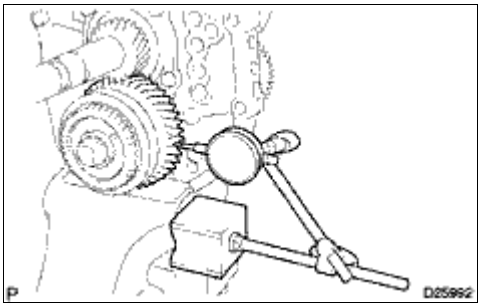


(a) Using a feeler gauge, measure the thrust clearance.

Standard clearance:
0.10 to 0.35 mm (0.00394 to 0.0137 in.)

If the clearance is not as specified, replace the counter shaft 5th gear with a new one.

2. INSPECT COUNTER SHAFT 5TH GEAR RADIAL CLEARANCE

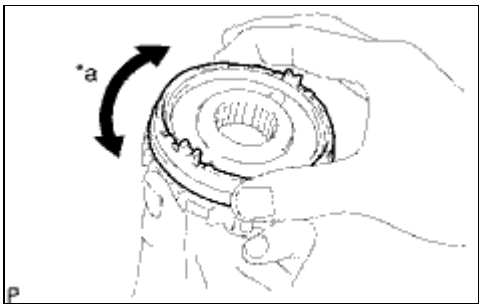


(a) Using a dial indicator, measure the radial clearance.

Standard clearance:
0.015 to 0.068 mm (0.000591 to 0.00267 in.)

If the clearance is not as specified, replace the counter shaft 5th gear with a new one.

3. INSPECT NO. 3 SYNCHRONIZER RING



(a) Apply gear oil to the cone part of the No. 5 gear spline piece, and check that it does not turn in either direction while pushing the No. 3 synchronizer ring against the No. 5 gear spline piece.

Text in Illustration

*a	Locks

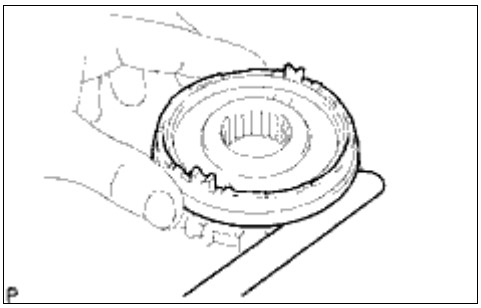
If it can turn, replace the No. 3 synchronizer ring.

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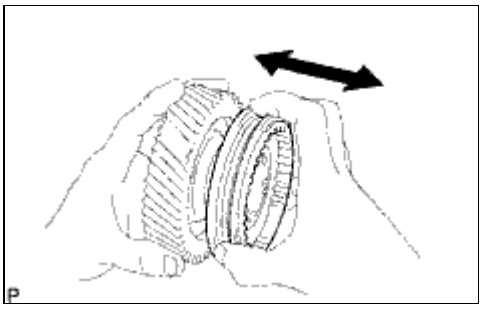
(b) Push the No. 3 synchronizer ring against the cone part of the No. 5 gear spline piece. Measure the clearance between the No. 3 synchronizer ring and the No. 5 gear spline piece.

Standard clearance:
0.68 to 1.32 mm (0.0268 to 0.0519 in.)

If the clearance is not as specified, replace the No. 3 synchronizer ring with a new one.



4. INSPECT NO. 3 TRANSMISSION HUB SLEEVE



(a) Check the sliding condition between the counter shaft 5th gear and the No. 3 transmission hub sleeve.

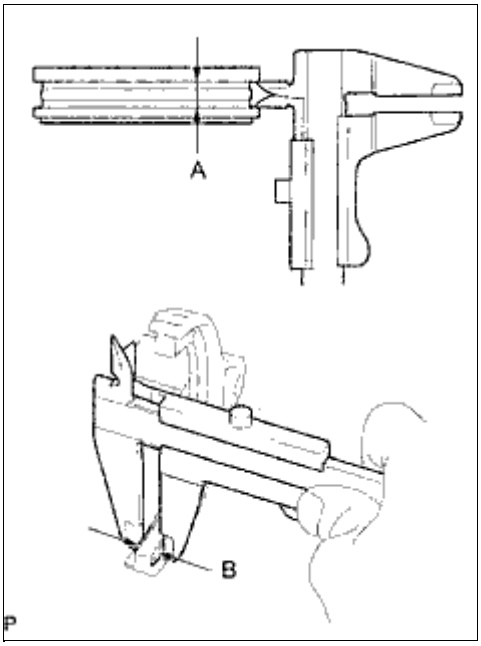
(b) Check the spline gear of the No. 3 transmission hub sleeve for wear.

If there are any defects, replace the No. 3 transmission hub sleeve.

(c) Using a vernier caliper, measure the No. 3 transmission hub sleeve groove (A) and the thickness of the claw part of the No. 3 shift fork (B) to calculate the clearance.

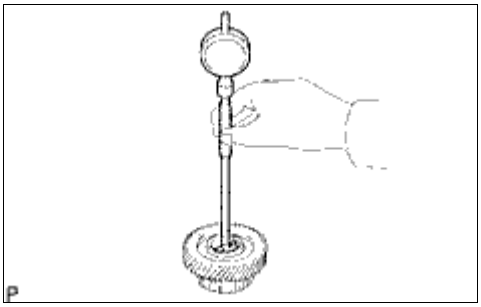
Standard clearance (A - B):
0.24 to 0.84 mm (0.00945 to 0.0330 in.)

If the clearance is not as specified, replace the No. 3 transmission hub sleeve and the No. 3 shift fork with new ones.



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5. INSPECT COUNTER SHAFT 5TH GEAR

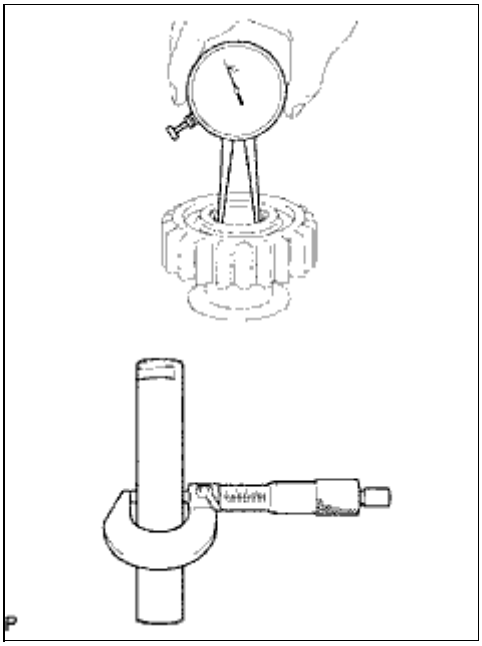


(a) Using a cylinder gauge, measure the inside diameter of the counter shaft 5th gear.

Standard diameter:
38.015 to 38.040 mm (1.4967 to 1.4976 in.)
Maximum diameter:
38.040 mm (1.4976 in.)

If the inside diameter is more than the maximum, replace the counter shaft 5th gear with a new one.

6. INSPECT REVERSE IDLER GEAR SUB-ASSEMBLY



(a) Using a caliper gauge, measure the inside diameter of the reverse idler gear sub-assembly.

Standard diameter:
24.040 to 24.061 mm (0.9465 to 0.9472 in.)
Maximum diameter:
24.061 mm (0.9472 in.)

If the inside diameter is more than the maximum, replace the reverse idler gear sub-assembly with a new one.

(b) Using a micrometer, measure the diameter of the sliding part of the reverse idler gear sub-assembly on the reverse idler gear shaft.

Standard diameter:
23.979 to 24.000 mm (0.9441 to 0.9448 in.)
Minimum diameter:
23.979 mm (0.9441 in.)

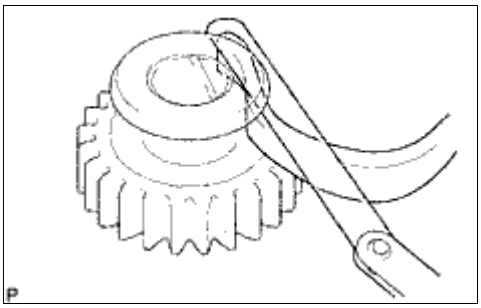
If the diameter is less than the minimum, replace the reverse idler gear shaft with a new one.

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(c) Using a feeler gauge, measure the thrust clearance of the shoe part between the reverse idler gear sub-assembly and the reverse shift arm.

Standard clearance:
0.05 to 0.35 mm (0.00197 to 0.0137 in.)

If the clearance is not as specified, replace the reverse idler gear sub-assembly and the reverse shift arm with new ones.



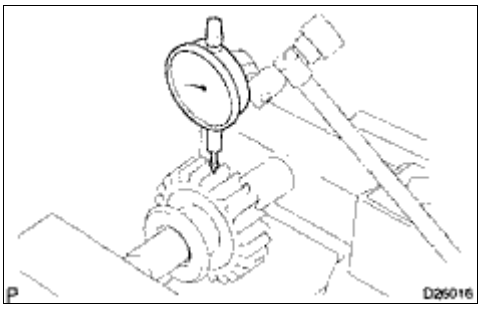
7. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE

(a) Install the reverse idler gear sub-assembly to the reverse idler gear shaft, and clamp it in a vise.

(b) Using a dial indicator, measure the radial clearance.

Standard clearance:
0.040 to 0.082 mm (0.00158 to 0.00322 in.)

If the clearance is not as specified, replace the reverse idler gear sub-assembly with a new one.



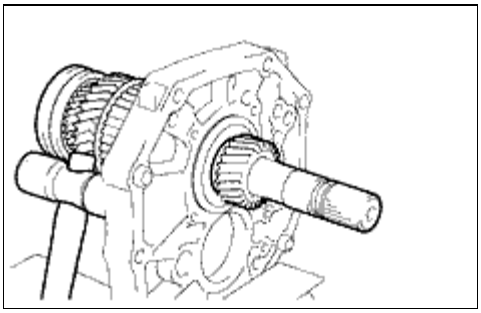
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176L00HX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. INSTALL OUTPUT SHAFT ASSEMBLY

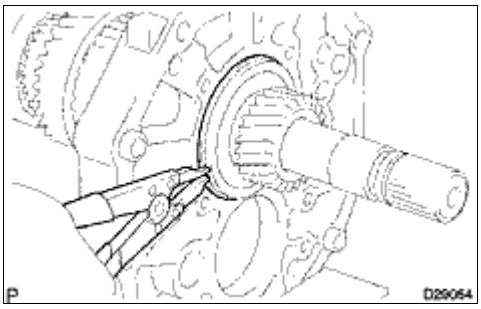
(a) Apply gear oil to the sliding part of the output shaft assembly.



(b) Using a plastic hammer, install the output shaft assembly by tapping the intermediate plate.

2. INSTALL OUTPUT SHAFT BEARING SHAFT SNAP RING

(a) Using a snap ring expander, install the output shaft bearing shaft snap ring to the output shaft assembly.

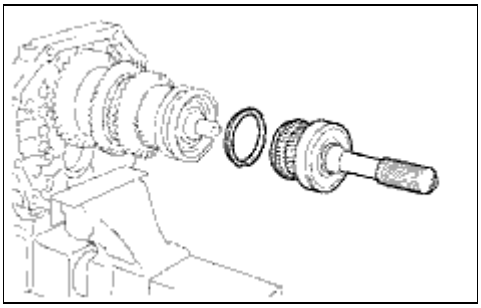


3. INSTALL INPUT SHAFT ASSEMBLY

(a) Apply gear oil to the input shaft assembly and the No. 2 synchronizer ring, and install them to the output shaft assembly.

NOTICE:

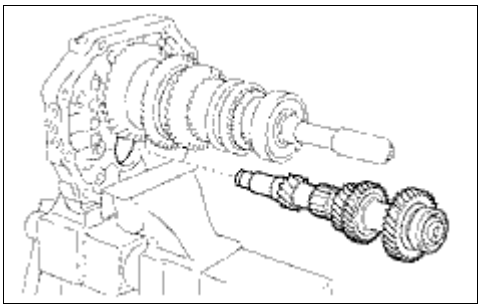
- Install the No. 2 synchronizer ring so the No. 2 synchromesh shifting key fits into the groove of the No. 2 synchronizer ring.
- Check that the input shaft assembly rotates smoothly.



4. INSTALL COUNTER GEAR ASSEMBLY

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(a) Temporarily install the counter gear assembly to the intermediate plate.

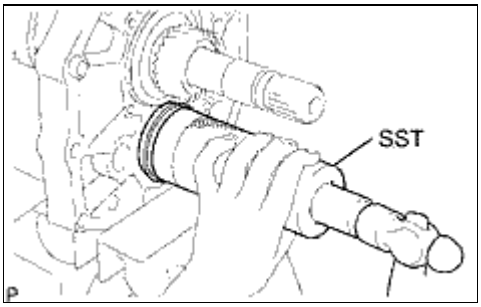


5. INSTALL COUNTER SHAFT CENTER BEARING

(a) Using SST and a hammer, install a new counter shaft center bearing to the intermediate plate.

SST: 09316-60011

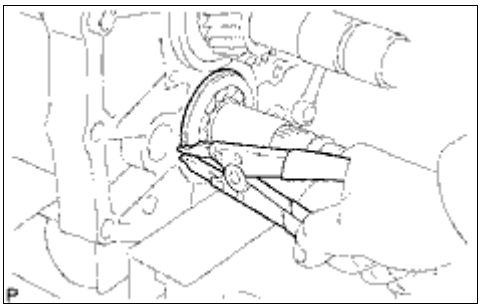
09316-00011



HINT:

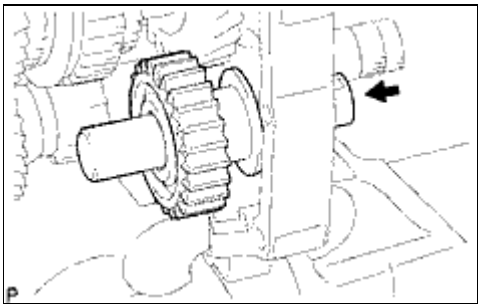
Install the counter shaft center bearing while tapping the tip of the counter gear assembly with a plastic hammer so that the counter gear assembly does not hit the side wall of the output shaft gear by being pushed forward.

(b) Using a snap ring expander, install the snap ring.



6. INSTALL REVERSE IDLER GEAR SUB-ASSEMBLY

(a) Apply gear oil to each sliding part of the reverse idler gear sub-assembly and the reverse idler gear shaft, and install the reverse idler gear sub-assembly and the reverse idler gear shaft to the intermediate plate.



NOTICE:

Install the reverse idler gear shaft with its groove facing the rear side, and install it from the rear side.

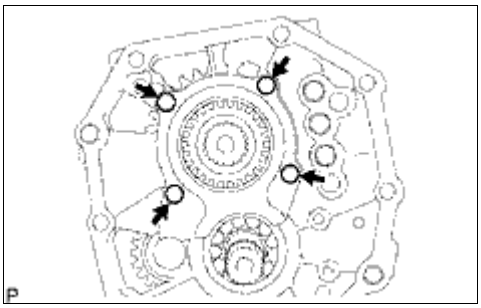
7. INSTALL OUTPUT SHAFT REAR BEARING RETAINER

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(a) Insert the output shaft rear bearing retainer into the groove of the reverse idler gear shaft and install it with the 4 bolts.

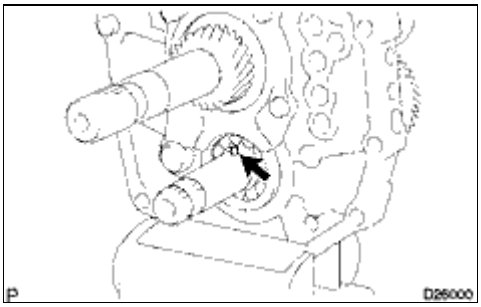
Torque:

25 N·m {255 kgf·cm, 18ft·lbf}



8. INSTALL 5TH GEAR THRUST WASHER PIN

(a) Apply MP grease to the 5th gear thrust washer pin, and install it to the counter gear assembly.

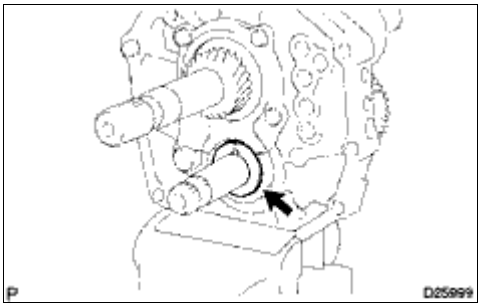


9. INSTALL 5TH GEAR THRUST WASHER

(a) Apply gear oil to the 5th gear thrust washer, and install it to the counter gear assembly.

NOTICE:

Install the 5th gear thrust washer so that its chamfer side faces forward.



10. INSTALL NO. 3 TRANSMISSION HUB SLEEVE

(a) Apply gear oil to the sliding part of the No. 3 transmission hub sleeve, and install it to the counter shaft 5th gear.

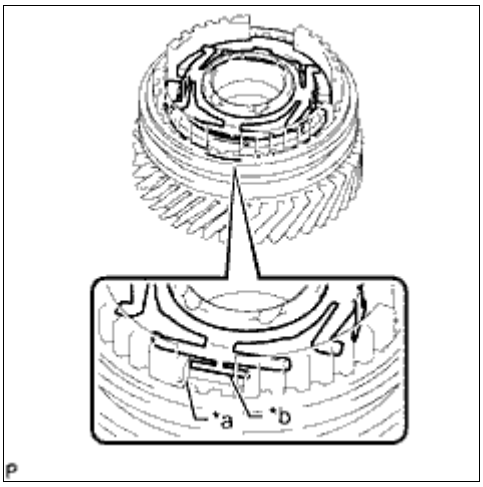
NOTICE:

Make sure that the No. 3 transmission hub sleeve and counter shaft 5th gear are oriented in the correct direction.

11. INSTALL NO. 3 SYNCHROMESH SHIFTING KEY

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(a) Install the 2 No. 3 synchromesh shifting keys and the No. 3 synchromesh shifting key spring to the counter shaft 5th gear as shown in the illustration.



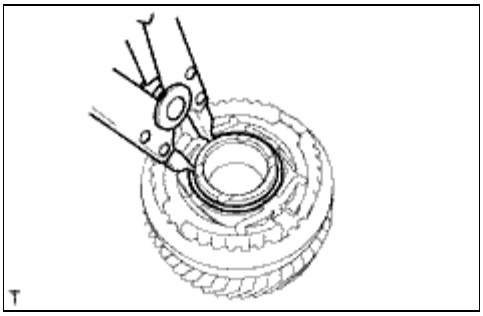
Text in Illustration

*a	Cutout
*b	Protrusion

HINT:

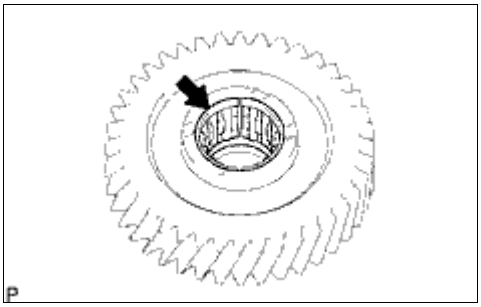
When installing the No. 3 synchromesh shifting key spring, make sure the protrusion fits into the cutout.

(b) Using a snap ring expander, install the snap ring to the counter shaft 5th gear.



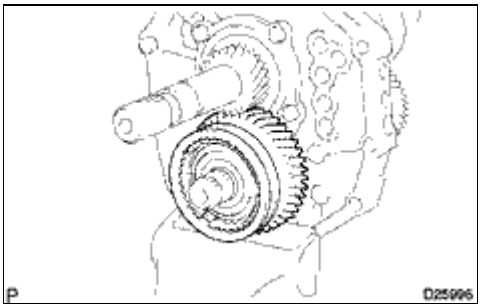
12. INSTALL COUNTER 5TH GEAR BEARING

(a) Apply gear oil to the counter 5th gear bearing, and install it to the counter shaft 5th gear.



13. INSTALL COUNTER SHAFT 5TH GEAR

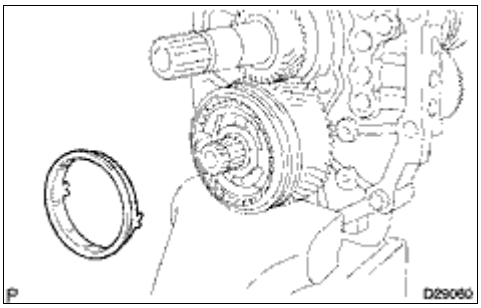
(a) Apply gear oil to the counter shaft 5th gear and the No. 3 transmission hub sleeve, and install them to the counter gear assembly.



14. INSTALL NO. 3 SYNCHRONIZER RING

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(a) Apply gear oil to the No. 3 synchronizer ring, and install it to the counter shaft 5th gear.



NOTICE:

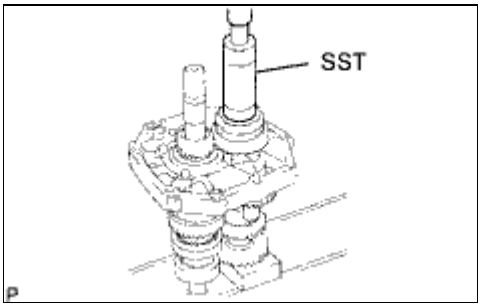
Install the No. 3 synchronizer ring so that the No. 3 synchromesh shifting key fits into the groove of the No. 3 synchronizer ring.

15. INSTALL NO. 5 GEAR SPLINE PIECE

(a) Using SST and a press, install the No. 5 gear spline piece to the counter gear assembly.

SST: 09316-60011

09316-00011



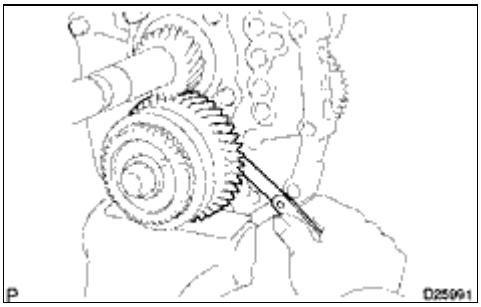
NOTICE:

Check that the gear rotates freely.

16. INSTALL COUNTER GEAR REAR SHAFT SNAP RING

(a) Select a counter gear rear shaft snap ring so that the thrust clearance between the No. 5 gear spline piece and the counter gear rear shaft snap ring is within the specified values.

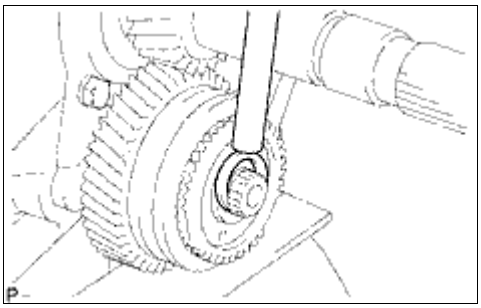
Standard clearance:
0.10 mm (0.00393 in.) or less
Counter Gear Rear Shaft Snap Ring Thickness:



PART NO.	MARK	THICKNESS MM (IN.)
90520-22016	A	2.85 (0.112)
90520-22017	B	2.90 (0.114)
90520-22018	C	2.95 (0.116)
90520-22019	D	3.00 (0.118)
90520-22020	E	3.05 (0.120)
90520-22021	F	3.10 (0.122)
90520-22022	G	3.15 (0.124)

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(b) Using a brass bar and a hammer, install the counter gear rear shaft snap ring to the counter gear assembly.

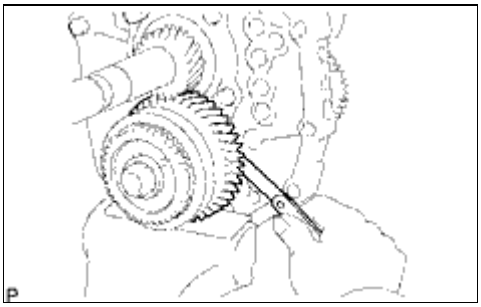


17. INSPECT COUNTER SHAFT 5TH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the thrust clearance.

Standard clearance:
0.10 to 0.35 mm (0.00394 to 0.0137 in.)

If the clearance is not as specified, replace the counter shaft 5th gear with a new one.

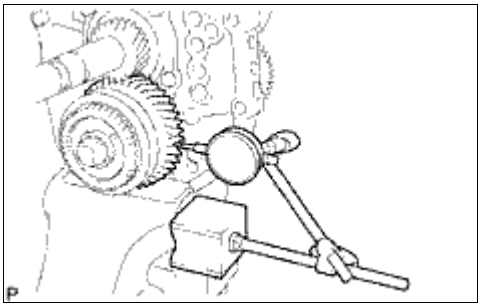


18. INSPECT COUNTER SHAFT 5TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance:
0.015 to 0.068 mm (0.000591 to 0.00267 in.)

If the clearance is not as specified, replace the counter 5th gear bearing with a new one.

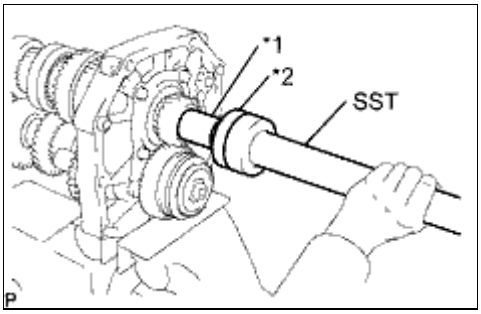


19. INSTALL OUTPUT SHAFT REAR BEARING

(a) Using SST and a press, install the output shaft spacer and a new output shaft rear bearing to the output shaft assembly.

Text in Illustration

*1	Output Shaft Spacer
*2	Output Shaft Rear Bearing



SST: 09309-35010

20. INSTALL OUTPUT SHAFT BEARING SHAFT SNAP RING

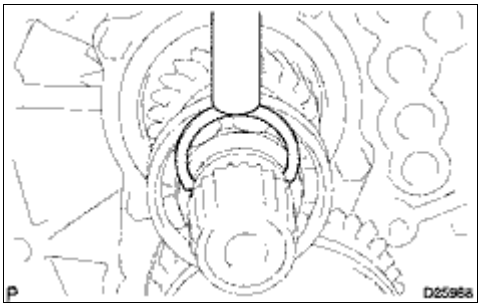
(a) Select an output shaft bearing shaft snap ring so the thrust clearance between the output shaft bearing shaft snap ring and the output shaft rear bearing is within the specified values.

Standard clearance:
0.10 mm (0.00393 in.) or less
Output Shaft Bearing Shaft Snap Ring Thickness:

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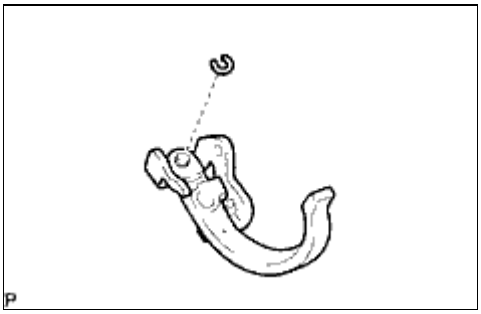
PART NO.	MARK	THICKNESS MM (IN.)
90520-28031	A	2.65 (0.104)
90520-28032	B	2.70 (0.106)
90520-28033	C	2.75 (0.108)
90520-28034	D	2.80 (0.110)
90520-28035	E	2.85 (0.112)
90520-28037	F	2.90 (0.114)
90520-28039	G	2.95 (0.116)
90520-28042	H	3.00 (0.118)
90520-28043	J	3.05 (0.120)
90520-28045	K	3.10 (0.122)
90520-28046	L	3.15 (0.124)
90520-28047	M	3.20 (0.126)
90520-28048	N	3.25 (0.128)
90520-28049	P	3.30 (0.130)
90520-28050	Q	3.35 (0.132)
90520-28051	R	3.40 (0.134)
90520-28052	S	3.45 (0.136)

(b) Using a brass bar and a hammer, install the output shaft bearing shaft snap ring to the output shaft assembly.



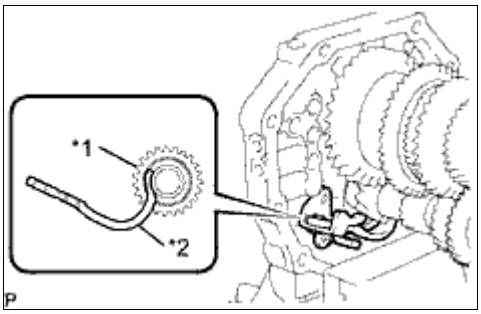
21. INSTALL REVERSE SHIFT ARM BRACKET

(a) Install the reverse shift arm to the reverse shift arm bracket with a new snap ring.



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(b) Insert the tip of the reverse shift arm into the reverse idler gear sub-assembly.

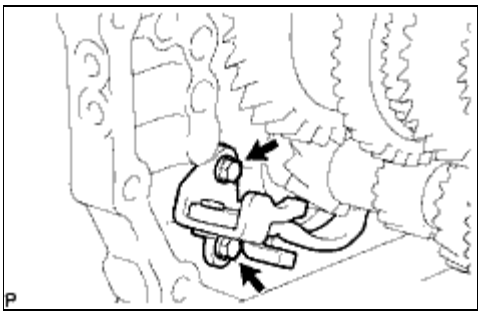


Text in Illustration

*1	Reverse Idler Gear Sub-assembly
*2	Reverse Shift Arm

(c) Install the reverse shift arm bracket to the intermediate plate with the 2 bolts.

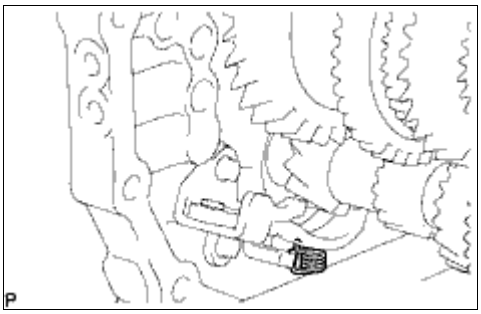
Torque:
18 N·m {184 kgf·cm, 13ft·lbf}



(d) Install the torsion spring to the reverse shift arm bracket.

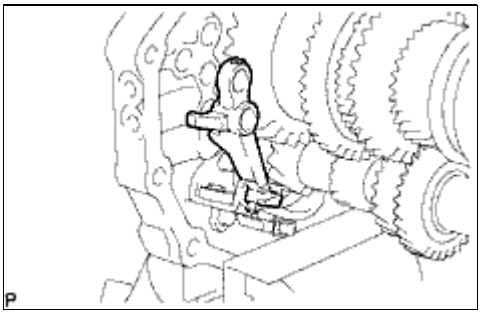
NOTICE:

Make sure that the torsion spring is securely installed to the reverse shift arm.



22. INSTALL REVERSE SHIFT FORK

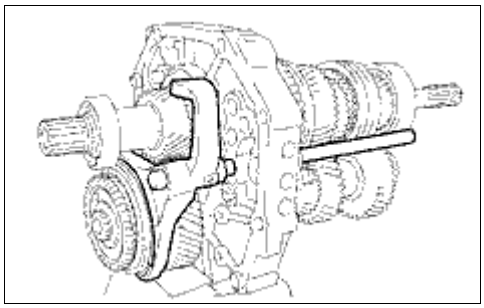
(a) Install the reverse shift fork to the reverse shift arm.



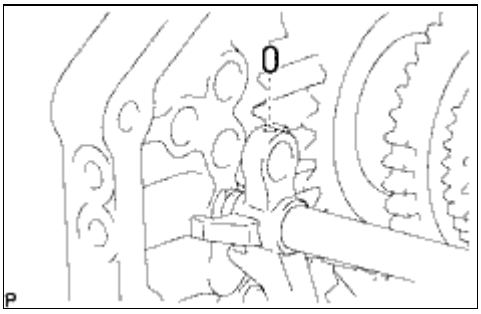
23. INSTALL REVERSE SHIFT FORK SHAFT

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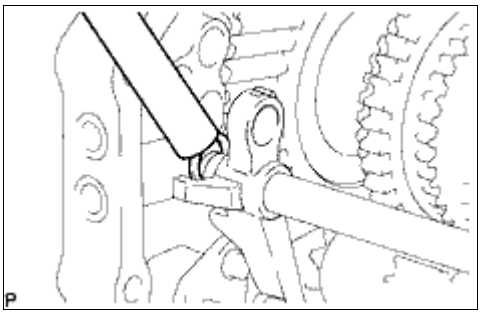
(a) Apply gear oil to the reverse shift fork shaft, and install the No. 3 shift fork to the No. 3 transmission hub sleeve and the reverse shift fork shaft to the intermediate plate from the front side.



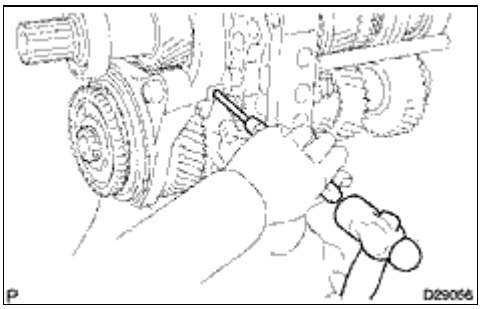
(b) Install the straight pin to the reverse shift fork.



(c) Using a brass bar and a hammer, tap on the shift fork shaft snap ring to the reverse shift fork shaft.

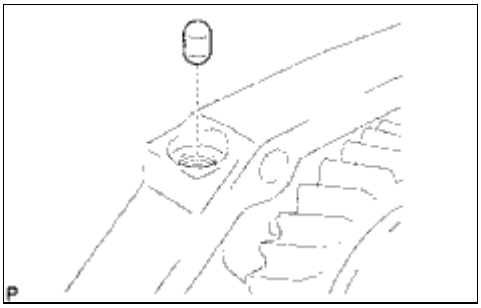


(d) Using a 5 mm pin punch and a hammer, install the shift fork set slotted spring pin to the No. 3 shift fork.



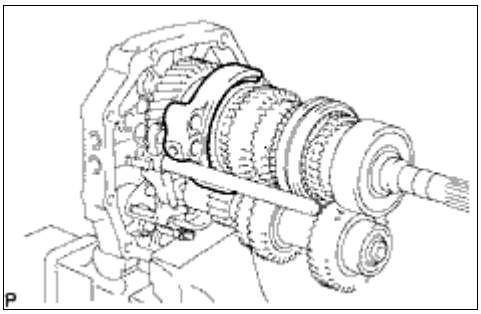
24. INSTALL NO. 1 GEAR SHIFT FORK SHAFT

(a) Install the No. 1 shift interlock roller to the intermediate plate.

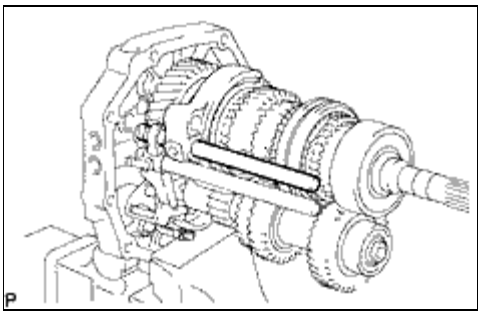


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(b) Install the No. 1 shift fork to the reverse gear.



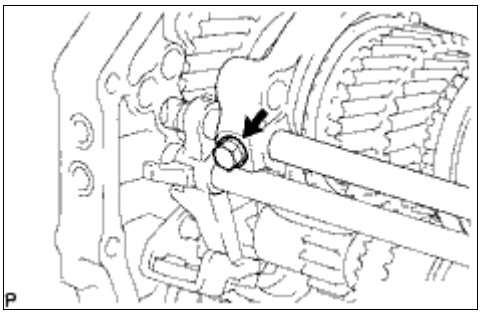
(c) Apply gear oil to the No. 1 gear shift fork shaft, and install the No. 1 gear shift fork shaft to the intermediate plate from the rear side.



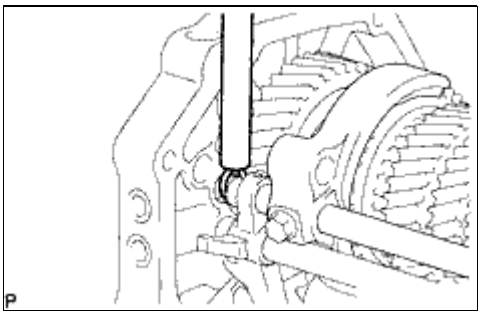
(d) Install a new bolt to the No. 1 shift fork.

Torque:

20 N·m {199 kgf·cm, 14ft·lbf}

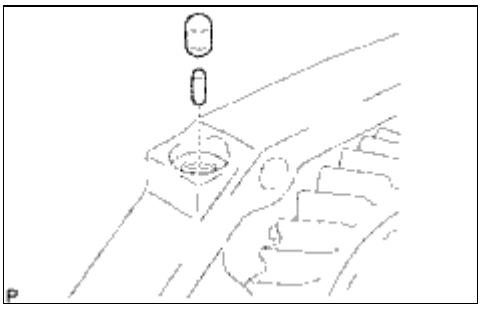


(e) Using a brass bar and a hammer, install the shift fork shaft snap ring to the No. 1 gear shift fork shaft.



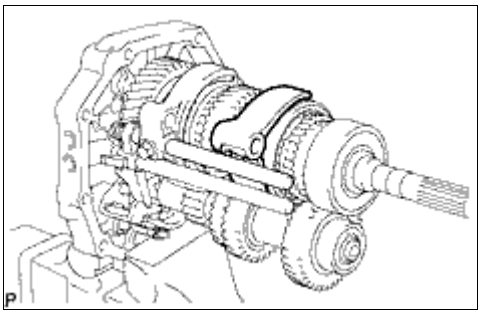
25. INSTALL NO. 2 GEAR SHIFT FORK SHAFT

(a) Install the shift interlock pin and the No. 1 shift interlock roller to the intermediate plate.

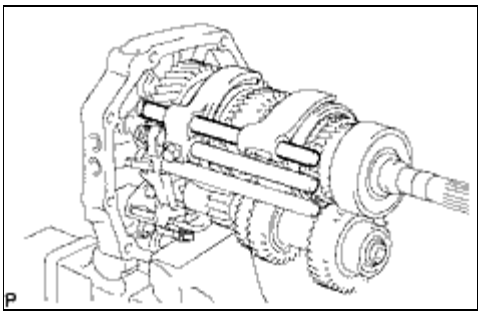


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(b) Install the No. 2 shift fork to the No. 2 transmission hub sleeve.



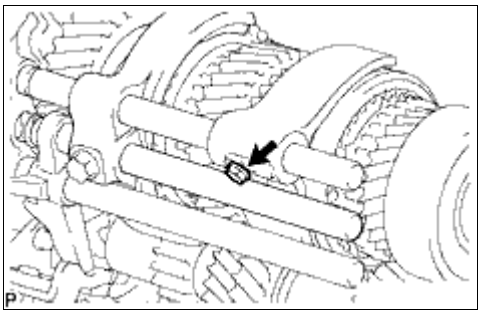
(c) Apply gear oil to the No. 2 gear shift fork shaft, and install the No. 2 shift fork shaft to the intermediate plate from the rear side.



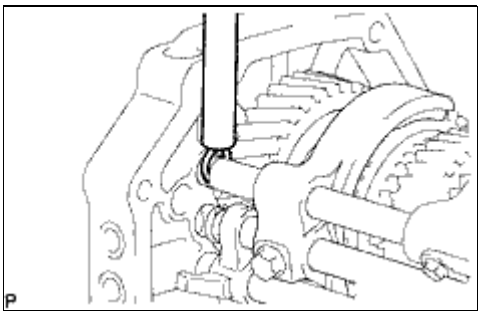
(d) Install a new bolt to the No. 2 shift fork.

Torque:

20 N·m {199 kgf·cm, 14ft·lbf}

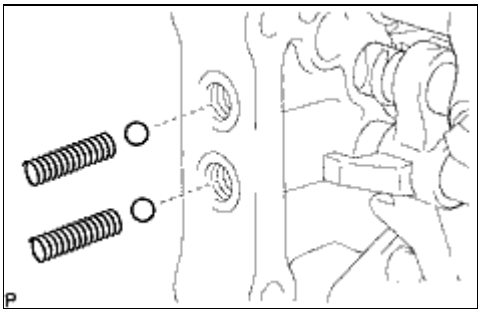


(e) Using a brass bar and a hammer, install the shift fork shaft snap ring to the No. 2 gear shift fork shaft.



26. INSTALL NO. 1 SHIFT DETENT BALL SPRING SEAT

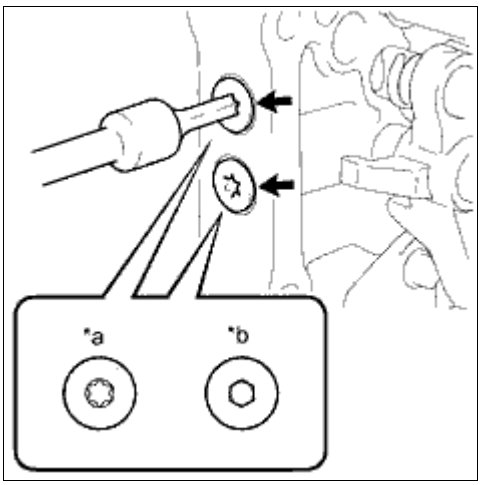
(a) Clean and degrease the 2 No. 1 shift detent ball spring seats and installation holes.



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(b) Install the 2 shift detent balls and the 2 shift detent ball low side compression springs to the intermediate plate.

(c) Apply adhesive to 2 or 3 threads on the 2 No. 1 shift detent ball spring seats.



Text in Illustration

*a	for Type A
*b	for Type B

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

To prevent contamination by foreign matter, install immediately after applying adhesive.

(d) for Type A:

Using a T40 "TORX" socket wrench, install the 2 No. 1 shift detent ball spring seat to the intermediate plate.

Torque:

19 N·m {189 kgf·cm, 14ft·lbf}

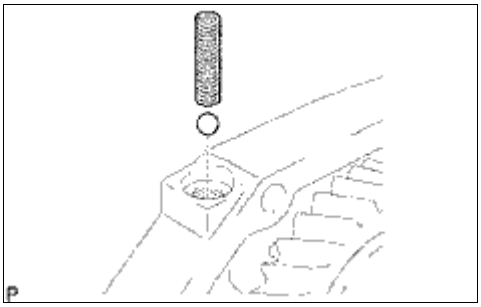
(e) for Type B:

Using a 6 mm hexagon socket wrench, install the 2 No.1 shift detent ball plug spring seat to the intermediate plate.

Torque:

19 N·m {189 kgf·cm, 14ft·lbf}

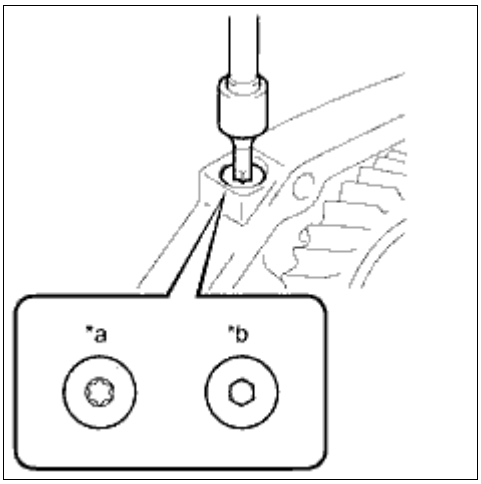
(f) Clean and degrease the No. 1 shift detent ball spring seat and installation hole.



(g) Install the shift detent ball and the shift detent ball low side compression spring to the intermediate plate.

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(h) Apply adhesive to 2 or 3 threads on the No. 1 shift detent ball spring seat.



Text in Illustration

*a	for Type A
*b	for Type B

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

To prevent contamination by foreign matter, install immediately after applying adhesive.

(i) for Type A:

Using a T40 "TORX" socket wrench, install the No. 1 shift detent ball spring seat to the intermediate plate.

Torque:

19 N·m {189 kgf·cm, 14ft·lbf}

(j) for Type B:

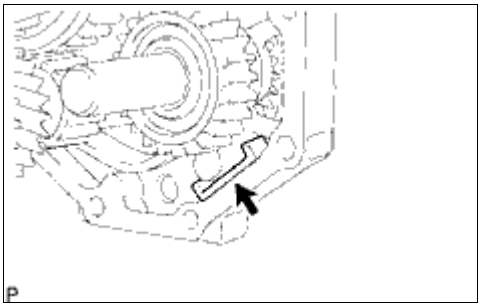
Using a 6 mm hexagon socket wrench, install the No.1 shift detent ball plug spring seat to the intermediate plate.

Torque:

19 N·m {189 kgf·cm, 14ft·lbf}

27. INSTALL TRANSMISSION MAGNET

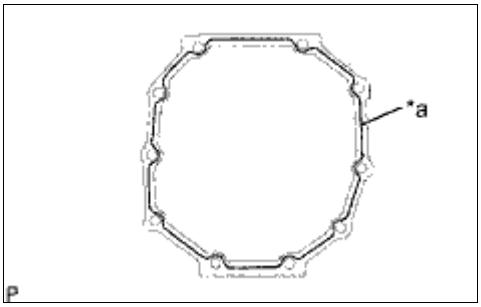
(a) Clean the transmission magnet, and install it to the intermediate plate.



28. INSTALL MANUAL TRANSMISSION CASE

(a) Clean and degrease the contact surfaces of the manual transmission case and the intermediate plate.

(b) Apply seal packing to the manual transmission case as shown in the illustration.



Text in Illustration

*a	Seal Packing (Seal Diameter: 1.2 mm (0.0472 in.))

Seal packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or

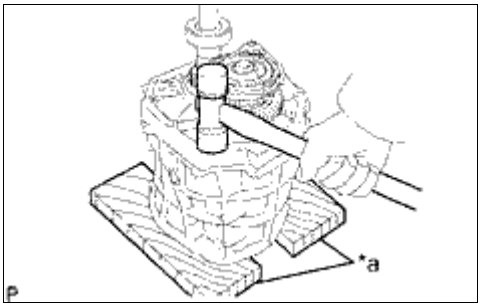
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equivalent

NOTICE:

Assemble the parts within 10 minutes of application. Otherwise, the seal packing material must be removed and reapplied.

(c) Using a plastic hammer, tap the manual transmission case to attach it to the intermediate plate.

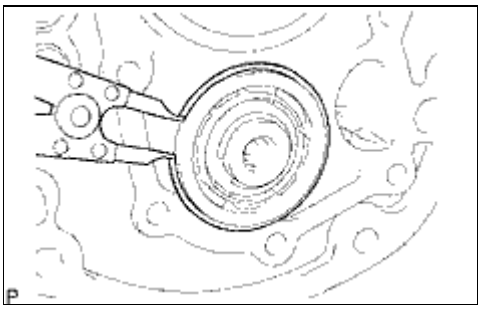


Text in Illustration

*a	Wooden Block

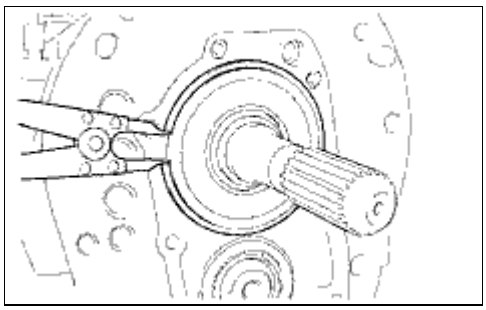
29. INSTALL NO. 1 COUNTER GEAR FRONT BEARING SNAP RING

(a) Using a snap ring expander, install the No. 1 counter gear front bearing snap ring to the counter gear front bearing.



30. INSTALL FRONT BEARING SHAFT SNAP RING

(a) Using a snap ring expander, install the front bearing shaft snap ring to the input shaft front bearing.



31. INSTALL TRANSMISSION FRONT BEARING RETAINER OIL SEAL

(a) Using SST and a hammer, install a new transmission front bearing retainer oil seal to the front bearing retainer.

SST: 09950-60010

09951-00520

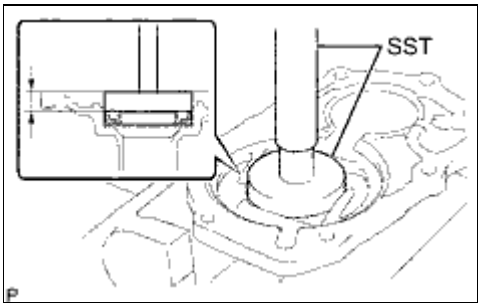
09952-06010

SST: 09950-70010

09951-07100

Standard depth:

11.2 to 12.2 mm (0.441 to 0.480 in.)



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(b) Lightly apply MP grease to the lip of the transmission front bearing retainer oil seal.

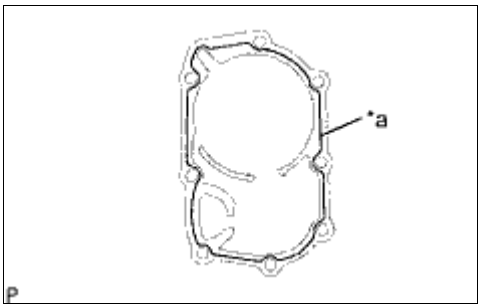
32. INSTALL FRONT BEARING RETAINER

(a) Clean and degrease the contact surfaces of the manual transmission case and the front bearing retainer.

(b) Apply seal packing to the front bearing retainer as shown in the illustration.

Text in Illustration

*a	Seal Packing (Seal Diameter: 1.2 mm (0.0472 in.))



Seal packing:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

Assemble the parts within 10 minutes of application. Otherwise, the seal packing material must be removed and reapplied.

(c) Clean and degrease the 8 bolts and installation holes.

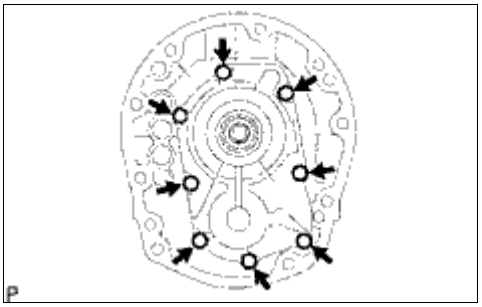
(d) Apply adhesive to 2 or 3 threads on the ends of the 8 bolts.

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

To prevent contamination by foreign matter, install immediately after applying adhesive.



(e) Install the front bearing retainer to the manual transmission case with the 8 bolts.

Torque:

17 N·m {168 kgf·cm, 12ft·lbf}

(f) Check that the input shaft assembly and the output shaft assembly rotate smoothly.

33. INSTALL TRANSFER ADAPTER OIL SEAL

(a) Using SST and a hammer, install a new transfer adapter oil seal to the transfer adapter.

SST: 09710-30050

SST: 09950-70010

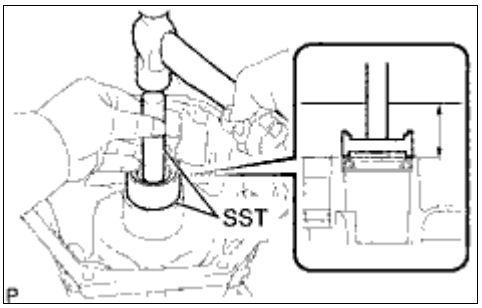
09951-07100

Standard depth:

45.4 to 46.4 mm (1.79 to 1.82 in.)

NOTICE:

Be careful not to damage the oil seal lip.



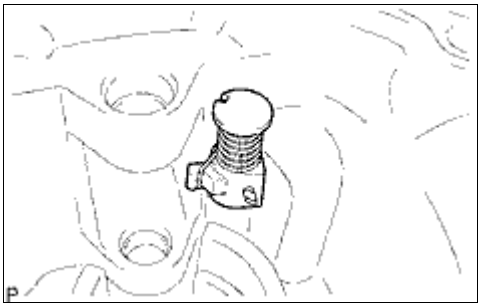
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(b) Lightly apply MP grease to the lip of the transfer adapter oil seal.

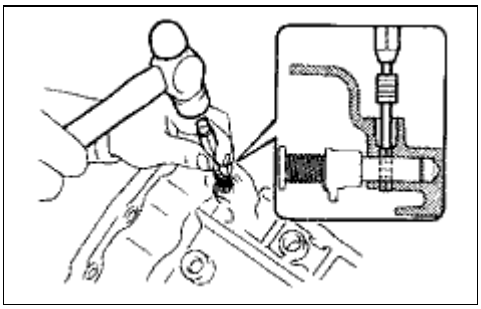
34. INSTALL REVERSE RESTRICT PIN

(a) Clean and degrease the plug and installation hole.

(b) Install the reverse restrict pin to the transfer adapter.



(c) Using a 5 mm pin punch and a hammer, install the reverse restrict slotted pin to the transfer adapter.



(d) Apply adhesive to 2 or 3 threads on the plug.

Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:

To prevent contamination by foreign matter, install immediately after applying adhesive.

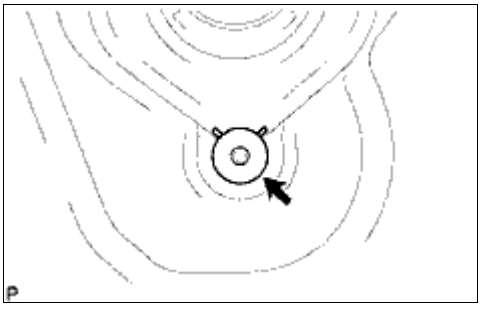
(e) Using a T40 "TORX" socket wrench, install the plug to the transfer adapter.

Torque:

19 N·m {189 kgf·cm, 14ft·lbf}

35. INSTALL OIL RECEIVER PIPE

(a) Install the oil receiver pipe to the transfer adapter.



36. INSTALL TRANSFER ADAPTER

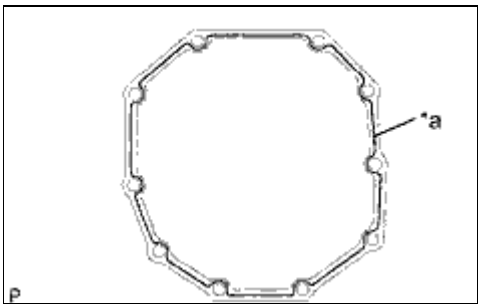
(a) Clean and degrease the contact surfaces of the manual transmission case and the transfer adapter.

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(b) Apply seal packing to the transfer adapter as shown in the illustration.

Text in Illustration

*a	Seal Packing (Seal Diameter: 1.2 mm (0.0472 in.))



Seal packing:

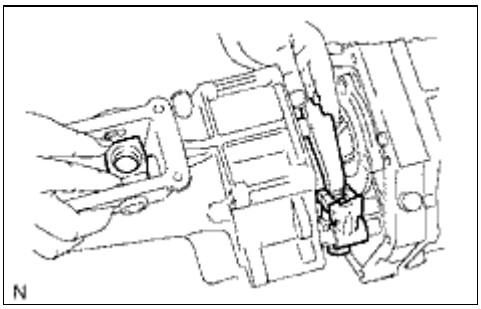
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

Assemble the parts within 10 minutes of application. Otherwise, the seal packing material must be removed and reapplied.

(c) Insert the shift and select lever to the transfer adapter.

(d) Connect the shift and select lever to the shift fork shaft and put in the shift lever housing.

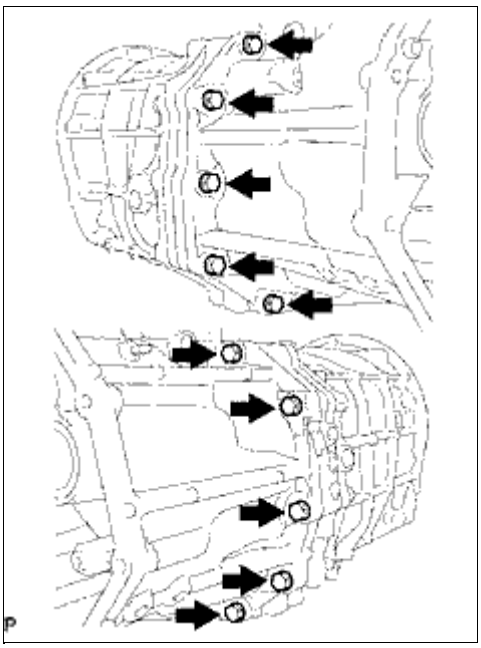


(e) Align the shift and select lever to the transfer adapter installation hole and push in the transfer adapter.

(f) Install the transfer adapter to the manual transmission case with the 10 bolts.

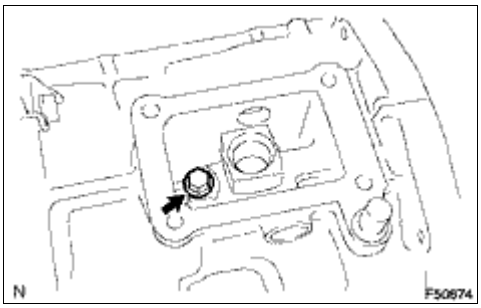
Torque:

37 N·m {377 kgf·cm, 27ft·lbf}



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(g) Clean and degrease the bolt and installation hole.



(h) Apply adhesive to 2 or 3 threads on the end of the bolt.

Adhesive:
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

NOTICE:

To prevent contamination by foreign matter, install immediately after applying adhesive.

(i) Install the bolt to the shift lever housing.

Torque:

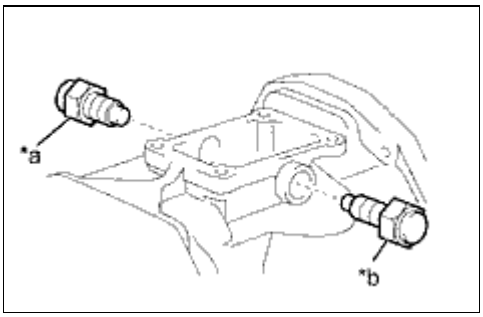
33 N·m {340 kgf·cm, 25ft·lbf}

37. INSTALL REVERSE RESTRICT PIN ASSEMBLY

(a) Install the 2 reverse restrict pin assemblies to the transfer adapter.

Text in Illustration

*a	Identification Paint Color: Red
*b	Identification Paint Color: Blue



Torque:

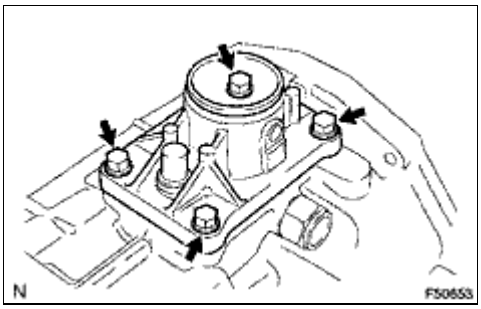
37 N·m {377 kgf·cm, 27ft·lbf}

38. INSTALL FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY

(a) Install a new oil deflector and the floor shift control shift lever retainer sub-assembly to the transfer adapter with the 4 bolts.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



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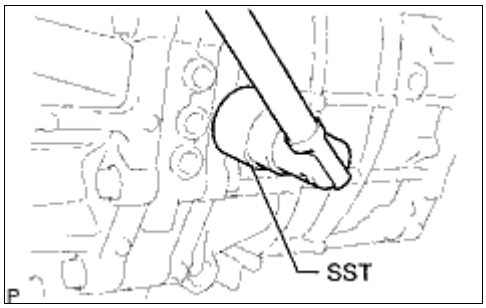
39. INSTALL BACK-UP LIGHT SWITCH ASSEMBLY

(a) Using SST, install a new gasket and the back-up light switch assembly to the manual transmission case.

SST: 09817-16011

Torque:

44 N·m {449 kgf·cm, 32ft·lbf}

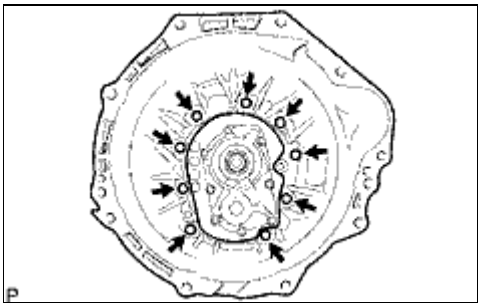


40. INSTALL CLUTCH HOUSING

(a) Install the clutch housing to the manual transmission case with the 9 bolts.

Torque:

36 N·m {367 kgf·cm, 27ft·lbf}



41. INSTALL CLUTCH RELEASE FORK BOOT

42. INSTALL RELEASE FORK SUPPORT INFO

43. INSTALL CLUTCH RELEASE FORK SUB-ASSEMBLY INFO

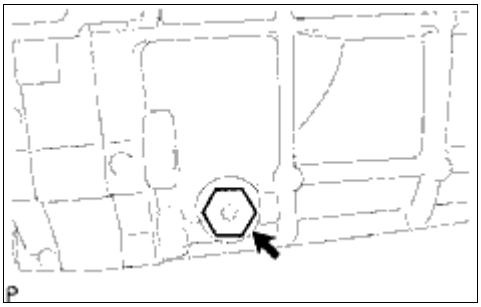
44. INSTALL CLUTCH RELEASE BEARING ASSEMBLY INFO

45. INSTALL DRAIN PLUG

(a) Install a new gasket and the drain plug to the manual transmission case.

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}



46. INSTALL FILLER PLUG

(a) Install a new gasket and the filler plug to the manual transmission case.

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}

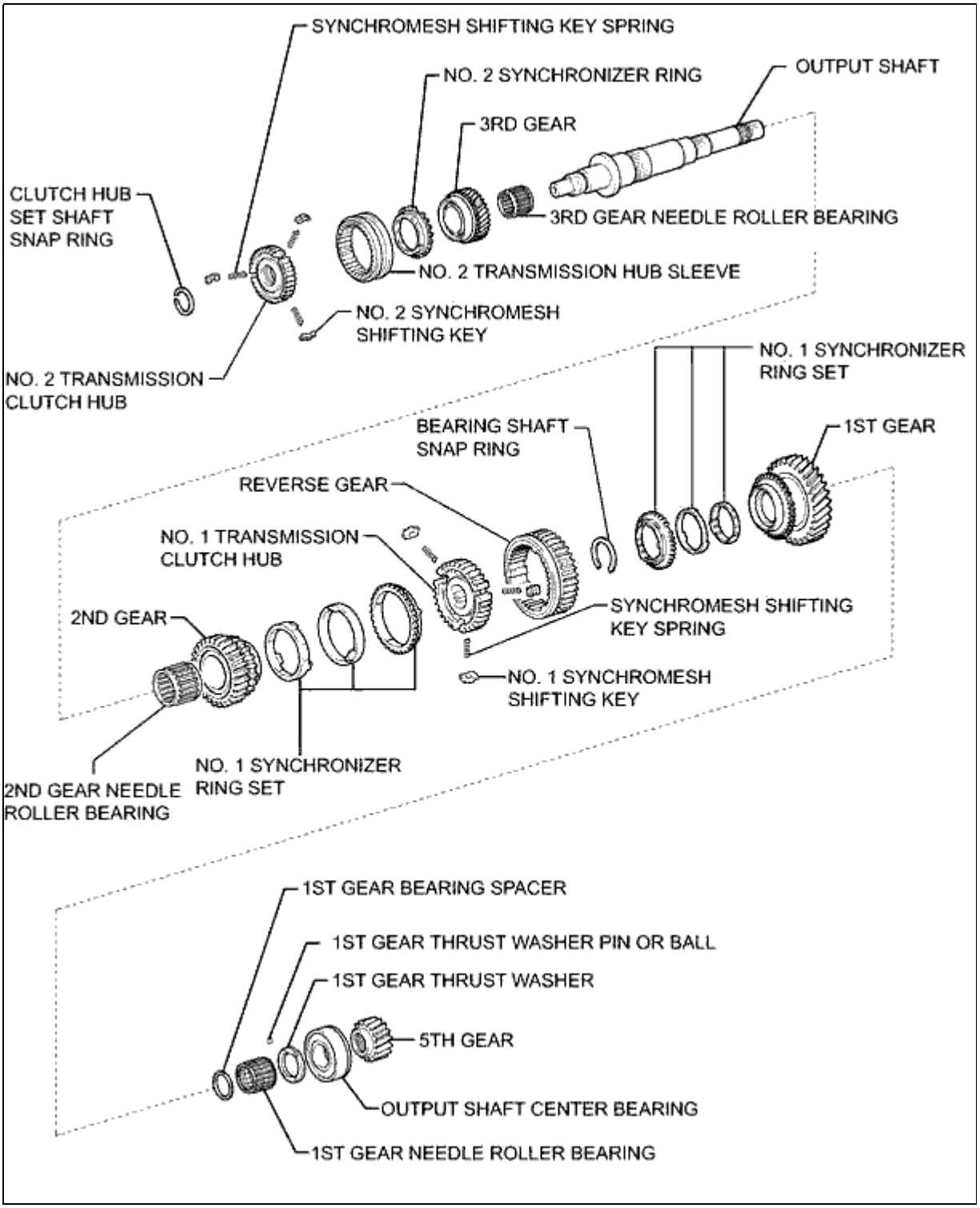


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM0000019XS00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: OUTPUT SHAFT: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION

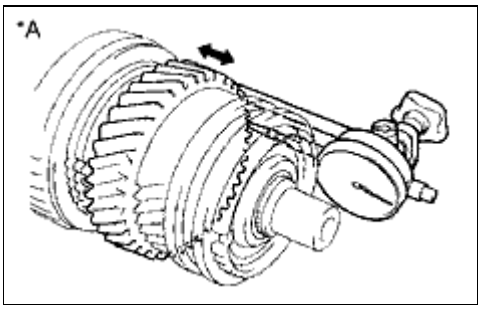


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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176Q00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: OUTPUT SHAFT: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. INSPECT 1ST GEAR THRUST CLEARANCE



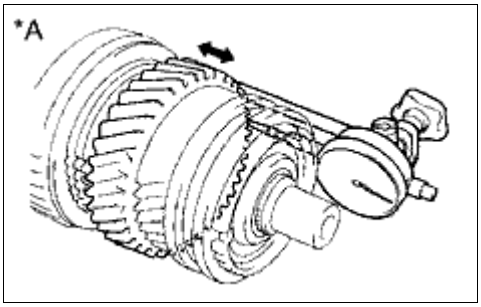
Text in Illustration

*A	1st

(a) Using a dial indicator measure the thrust clearance of the 1st gear.

Standard clearance:
0.30 to 0.55 mm (0.0118 to 0.0216 in.)

2. INSPECT 2ND GEAR THRUST CLEARANCE



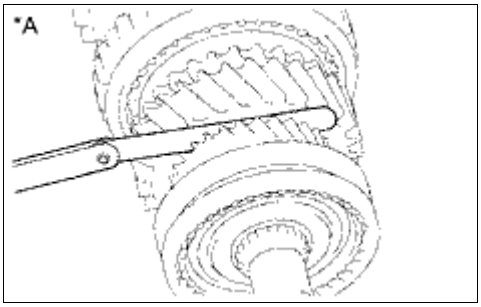
Text in Illustration

*A	2nd

(a) Using a dial indicator measure the thrust clearance of the 2nd gear.

Standard clearance:
0.10 to 0.25 mm (0.00394 to 0.00984 in.)

3. INSPECT 3RD GEAR THRUST CLEARANCE



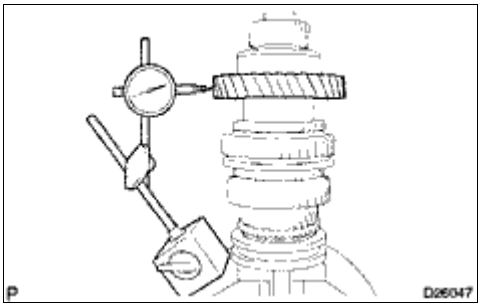
Text in Illustration

*A	3rd

(a) Using a feeler gauge, measure the thrust clearance of the 3rd gear.

Standard clearance:
0.10 to 0.25 mm (0.00394 to 0.00984 in.)

4. INSPECT 1ST GEAR RADIAL CLEARANCE



(a) Using a dial indicator, measure the radial clearance of the 1st gear.

Standard clearance:
0.020 to 0.073 mm (0.000785 to 0.00287 in.)

If the clearance is not within the specified values, replace the 1st gear needle roller bearing with a new one.

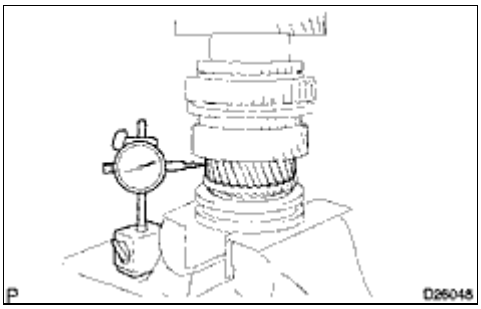
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5. INSPECT 2ND GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance of the 2nd gear.

Standard clearance:
0.015 to 0.068 mm (0.000591 to 0.00267 in.)

If the clearance is not within the specified values, replace the 2nd gear needle roller bearing with a new one.

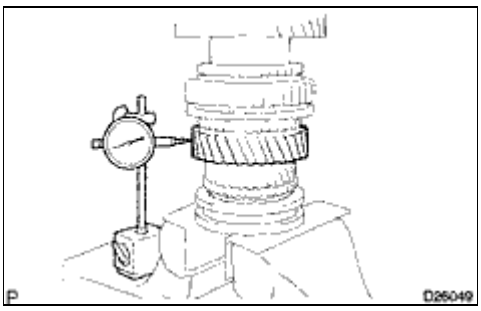


6. INSPECT 3RD GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance of the 3rd gear.

Standard clearance:
0.015 to 0.068 mm (0.000591 to 0.00267 in.)

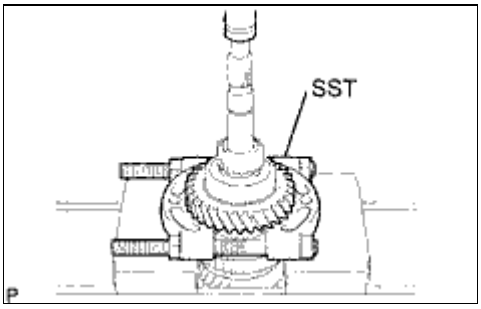
If the clearance is not within the specified values, replace the 3rd gear needle roller bearing with a new one.



7. REMOVE 1ST GEAR

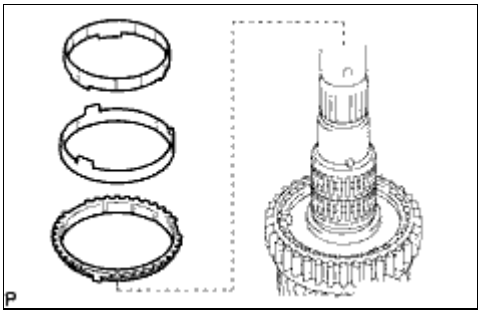
(a) Using SST and a press, remove the 5th gear, output shaft center bearing, 1st gear thrust washer and 1st gear from the output shaft.

SST: 09950-00020



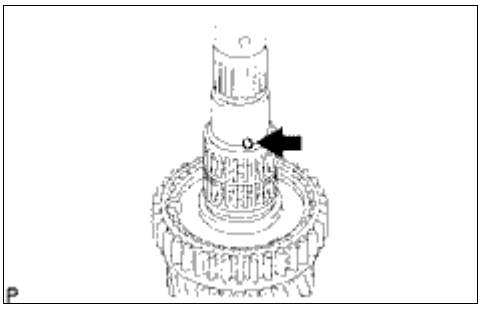
8. REMOVE NO. 1 SYNCHRONIZER RING SET

(a) Remove the No. 1 synchronizer ring set (for 1st gear) from the output shaft.



9. REMOVE 1ST GEAR THRUST WASHER PIN OR BALL

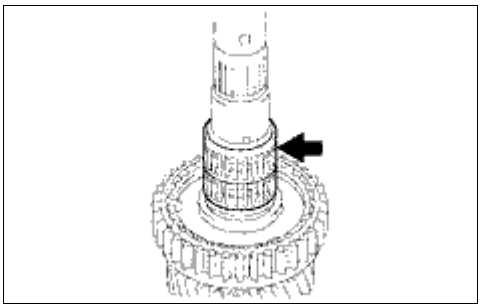
(a) Remove the 1st gear thrust washer pin from the output shaft.



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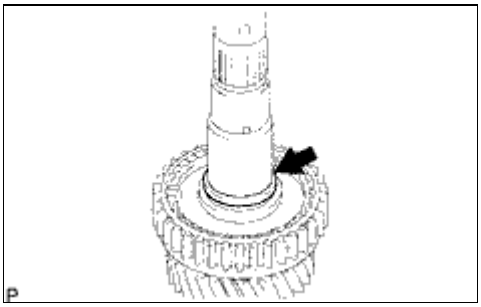
10. REMOVE 1ST GEAR NEEDLE ROLLER BEARING

(a) Remove the 1st gear needle roller bearing from the output shaft.



11. REMOVE 1ST GEAR BEARING SPACER

(a) Remove the 1st gear bearing spacer from the output shaft.

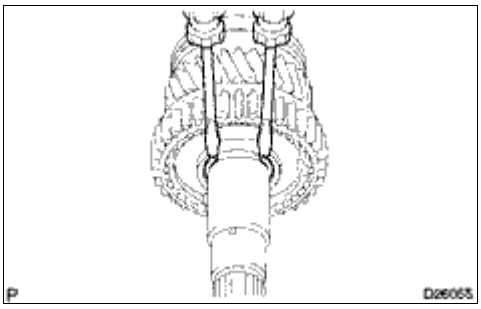


12. REMOVE BEARING SHAFT SNAP RING

(a) Using 2 screwdrivers and a hammer, remove the bearing shaft snap ring from the output shaft.

NOTICE:

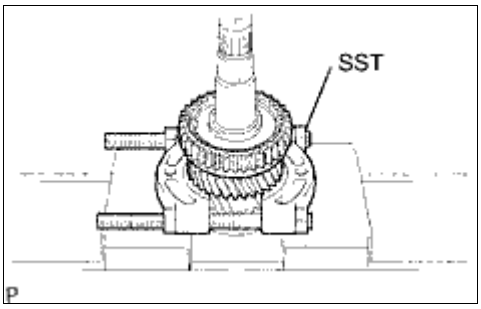
Use a shop towel to prevent the snap ring from flying off.



13. REMOVE 2ND GEAR

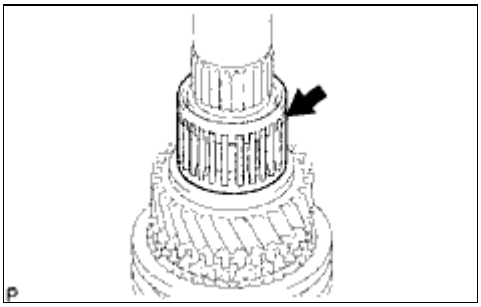
(a) Using SST and a press, remove the No. 1 transmission clutch hub, reverse gear, No. 1 synchronizer ring and 2nd gear from the output shaft.

SST: 09950-00020



14. REMOVE 2ND GEAR NEEDLE ROLLER BEARING

(a) Remove the 2nd gear needle roller bearing from the output shaft.



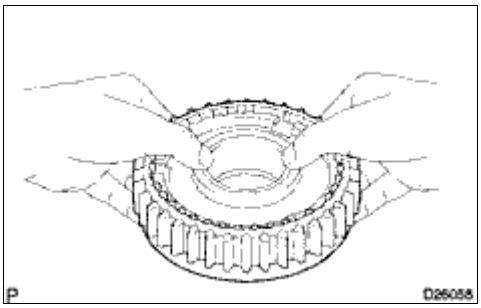
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15. REMOVE REVERSE GEAR

(a) Remove the reverse gear, 3 No. 1 synchromesh shifting keys and 3 synchromesh shifting key springs.

NOTICE:

Use a piece of cloth to prevent the shifting keys and shifting key springs from popping out.

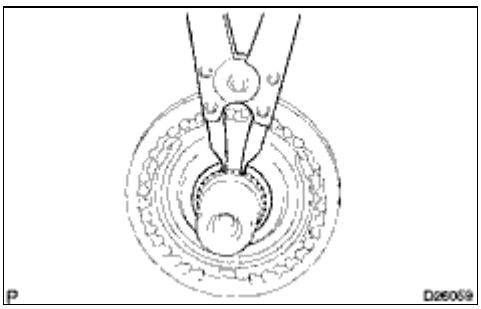


16. REMOVE CLUTCH HUB SET SHAFT SNAP RING

(a) Using a snap ring expander, remove the clutch hub set shaft snap ring from the output shaft.

NOTICE:

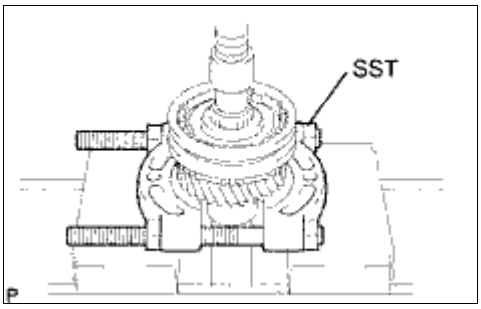
Do not damage the sliding surface of the bearing.



17. REMOVE 3RD GEAR

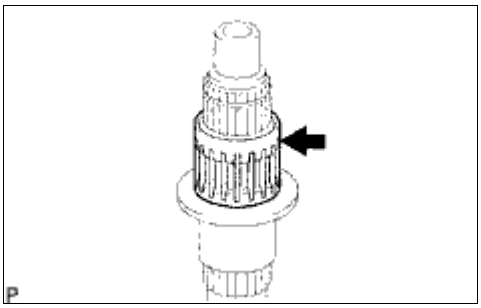
(a) Using SST and a press, remove the No. 2 transmission clutch hub with the No. 2 transmission hub sleeve, the No. 2 synchronizer ring and the 3rd gear from the output shaft.

SST: 09950-00020



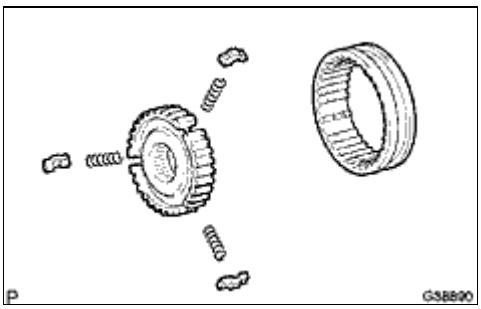
18. REMOVE 3RD GEAR NEEDLE ROLLER BEARING

(a) Remove the 3rd gear needle roller bearing from the output shaft.



19. REMOVE NO. 2 TRANSMISSION HUB SLEEVE

(a) Remove the No. 2 transmission hub sleeve, 3 synchromesh shifting key springs and 3 No. 2 synchromesh shifting keys from the No. 2 transmission clutch hub.

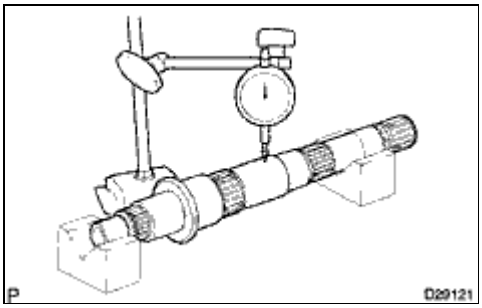


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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM00000176P00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: OUTPUT SHAFT: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT OUTPUT SHAFT



(a) Using a dial indicator, measure the circle runout of the output shaft.

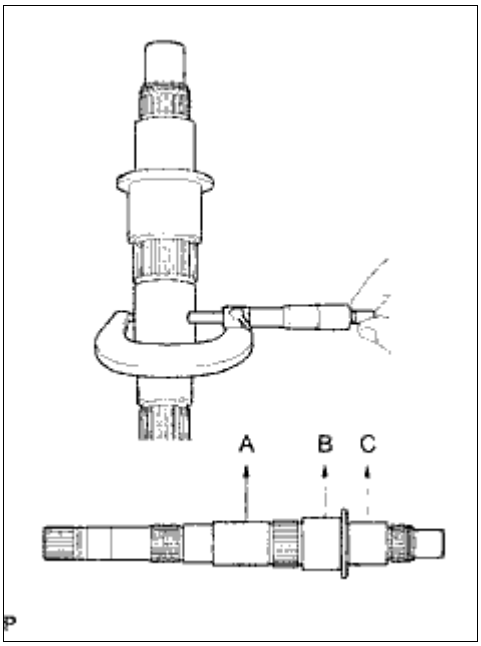
Maximum circle runout:
0.03 mm (0.00118 in.)

If the circle runout is greater than the maximum, replace the output shaft with a new one.

(b) Using a micrometer, measure the outer diameter of the output shaft at A, B and C.

Standard diameter:
38.979 to 38.995 mm (1.5346 to 1.5352 in.) for A
46.984 to 47.000 mm (1.8498 to 1.8504 in.) for B
37.984 to 38.000 mm (1.4954 to 1.4961 in.) for C
Minimum diameter:
38.979 mm (1.5346 in.) for A
46.984 mm (1.8498 in.) for B
37.984 mm (1.4954 in.) for C

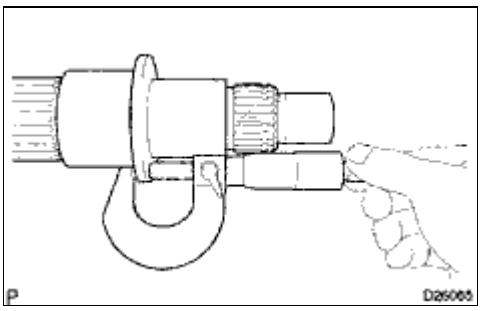
If the outer diameter is less than the minimum, replace the output shaft with a new one.



(c) Using a micrometer, measure the thickness of the output shaft flange as shown in the illustration.

Standard thickness:
4.8 to 5.2 mm (0.189 to 0.204 in.)

If the thickness is not within the specified values, replace the output shaft.



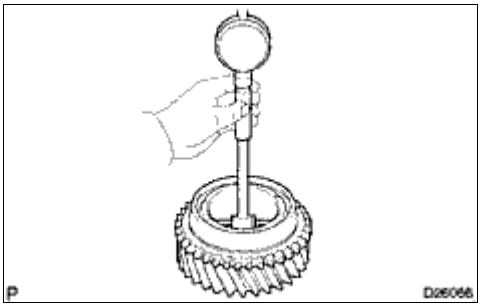
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2. INSPECT 3RD GEAR

(a) Using a cylinder gauge, measure the inner diameter of the 3rd gear.

Standard diameter:
44.015 to 44.040 mm (1.7329 to 1.7339 in.)
Maximum diameter:
44.040 mm (1.7339 in.)

If the inner diameter is greater than the maximum, replace the 3rd gear with a new one.

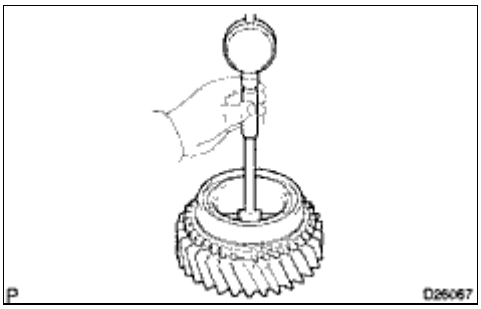


3. INSPECT 2ND GEAR

(a) Using a cylinder gauge, measure the inner diameter of the 2nd gear.

Standard diameter:
53.015 to 53.040 mm (2.0872 to 2.0881 in.)
Maximum diameter:
53.040 mm(2.0881 in.)

If the inner diameter is greater than the maximum, replace the 2nd gear with a new one.

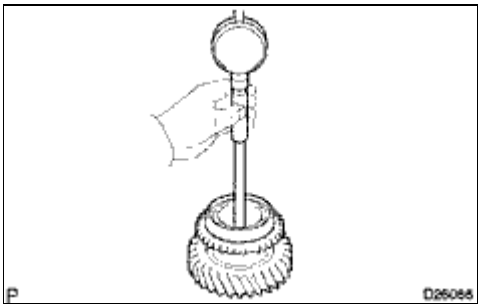


4. INSPECT 1ST GEAR

(a) Using a cylinder gauge, measure the inner diameter of the 1st gear.

Standard diameter:
46.015 to 46.040 mm (1.812 to 1.8126 in.)
Maximum diameter:
46.040 mm (1.8126 in.)

If the inner diameter is greater than the maximum, replace the 1st gear with a new one.

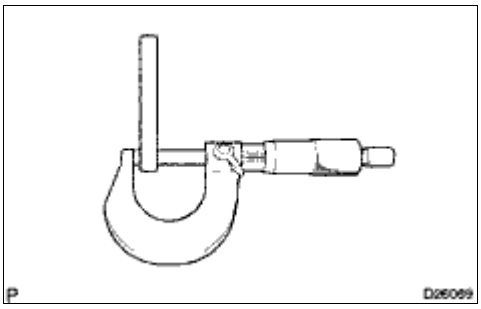


5. INSPECT 1ST GEAR THRUST WASHER

(a) Using a micrometer, measure the thickness of the 1st gear thrust washer.

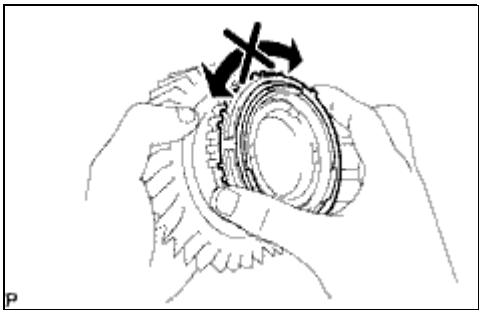
Standard thickness:
5.95 to 6.05 mm (0.235 to 0.238 in.)
Minimum thickness:
5.95 mm (0.235 in.)

If the thickness is out of specification, replace the 1st gear thrust washer.



6. INSPECT NO. 1 SYNCHRONIZER RING

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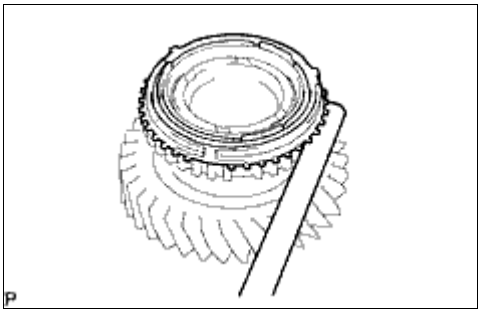
(a) Apply gear oil to the cone of the 1st gear, and check that it does not turn in both directions while pushing the No. 1 synchronizer ring (for the 1st gear).

If it turns, replace the No. 1 synchronizer ring.

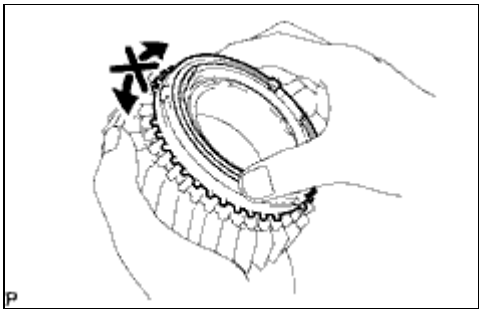
(b) Measure the clearance between the No. 1 synchronizer ring and the 1st gear while pushing the No. 1 synchronizer ring to the cone of the 1st gear.

Standard clearance:
0.75 to 1.65 mm (0.0295 to 0.0650 in.)

If the clearance is not within the specified values, replace the No. 1 synchronizer ring with a new one.



7. INSPECT NO. 1 SYNCHRONIZER RING SET



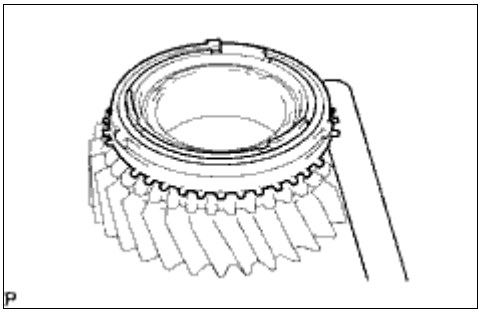
(a) Apply gear oil to the cone of the 2nd gear, and check that it does not turn in both directions while pushing the No. 1 synchronizer ring set (for the 2nd synchronizer ring).

If it turns, replace the No. 1 synchronizer ring set.

(b) Measure the clearance between the No. 1 synchronizer ring set (for the 2nd synchronizer ring) and 2nd gear while pushing the No. 1 synchronizer ring set to the cone of the 2nd gear.

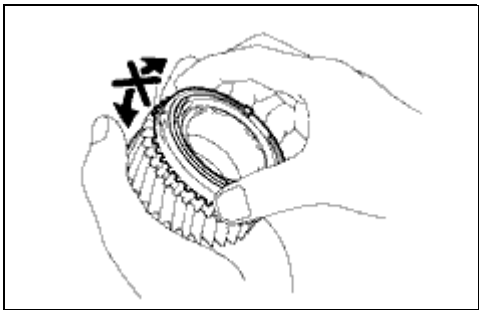
Standard clearance:
0.65 to 1.75 mm (0.0256 to 0.0689 in.)

If the clearance is not within the specified values, replace the No. 1 synchronizer ring set (for the 2nd synchronizer ring) with a new one.



8. INSPECT NO. 2 SYNCHRONIZER RING

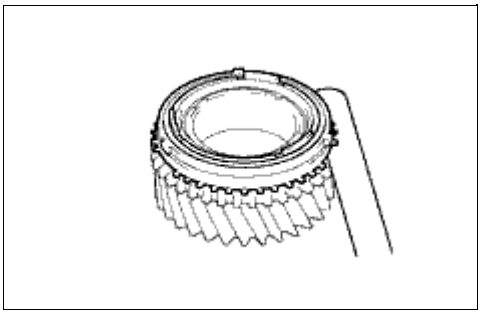
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(a) Apply gear oil to the cone of the 3rd gear, and check that it does not turn in both directions while pushing the No. 2 synchronizer ring (for the 3rd synchronizer ring).

If it turns, replace the No. 2 synchronizer ring.

(b) Check the clearance between the No. 2 synchronizer ring (for the 3rd synchronizer ring) and 3rd gear while pushing the No. 2 synchronizer ring (for the 2nd synchronizer ring) to the cone of the 3rd gear.

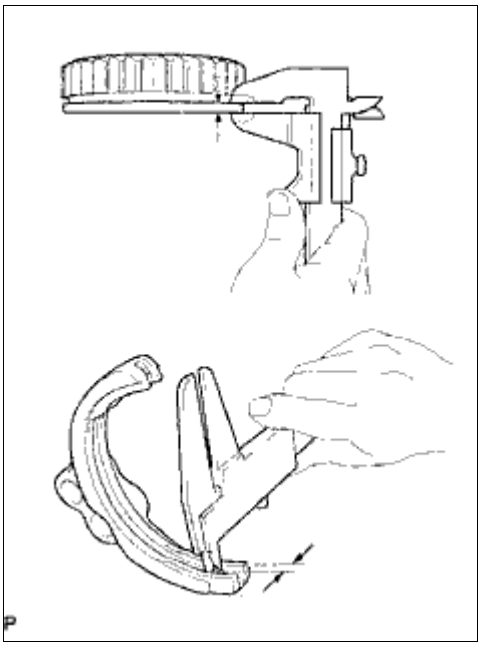


Standard clearance:
0.75 to 1.65 mm (0.0295 to 0.0650 in.)

If the clearance is not within the specified values, replace the No. 2 synchronizer ring (for the 3rd synchronizer ring) with a new one.

9. INSPECT REVERSE GEAR

(a) Using a vernier caliper, measure the reverse gear groove and the thickness of the No. 1 gear shift fork claw clearance.

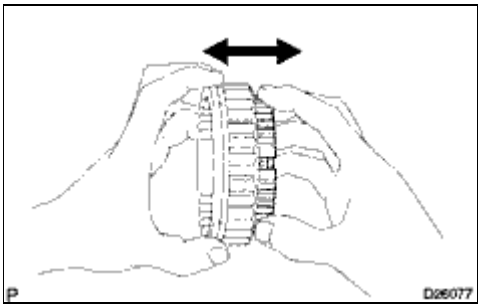


Standard clearance:
0.15 to 0.41 mm (0.00591 to 0.0161 in.)

If the clearance is not within the specified values, replace the No. 1 reverse gear and the shift fork with new ones.

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10. INSPECT NO. 1 TRANSMISSION CLUTCH HUB



(a) Check that the No. 1 transmission clutch hub and reverse gear slide smoothly against each other.

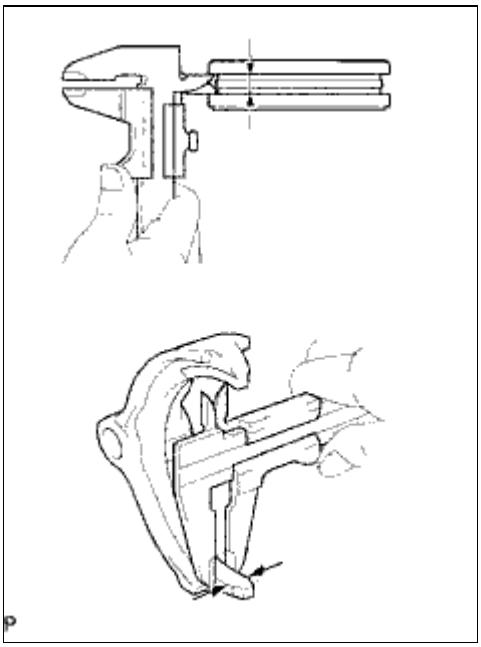
(b) Check the tip of the internal spline of the reverse gear for wear.

If there are any defects, replace the reverse gear.

(c) Check the tip of the external spline of the clutch hub for wear.

If there are any defects, replace the No. 1 transmission clutch hub.

11. INSPECT NO. 2 TRANSMISSION HUB SLEEVE

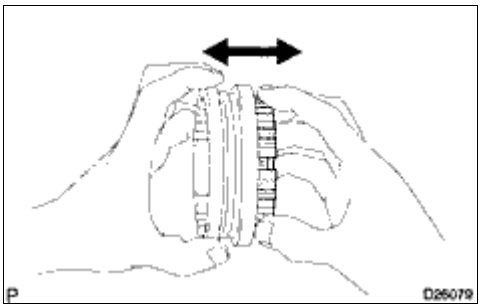


(a) Using a vernier caliper, measure the clearance between the No. 2 transmission hub groove and claw of the No. 2 gear shift fork.

Standard clearance:
0.15 to 0.35 mm (0.00591 to 0.0138 in.)

If the clearance is not within the specified values, replace the No. 2 transmission hub sleeve and the No. 2 shift fork with the new ones.

12. INSPECT NO. 2 TRANSMISSION CLUTCH HUB



(a) Check the sliding condition between the No. 2 transmission clutch hub and the No. 2 transmission hub sleeve.

(b) Check the tip of the internal spline of the No. 2 hub sleeve for wear.

If there are any defects, replace the No. 2 hub sleeve.

(c) Check the tip of the external spline of the No. 2 transmission clutch hub for wear.

If there are any defects, replace the No. 2 transmission clutch hub.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000176R00NX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: OUTPUT SHAFT: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

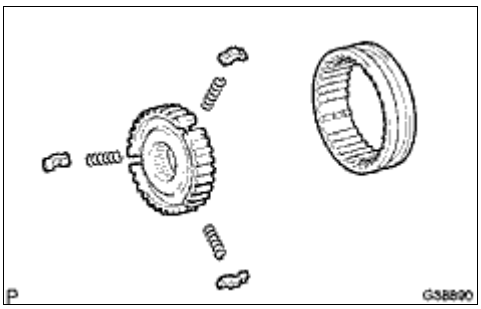
1. INSTALL NO. 2 TRANSMISSION HUB SLEEVE

(a) Install the 3 No. 2 synchromesh shifting key springs and the 3 No. 2 synchro-mesh shifting key to the No. 2 transmission clutch hub.

NOTICE:

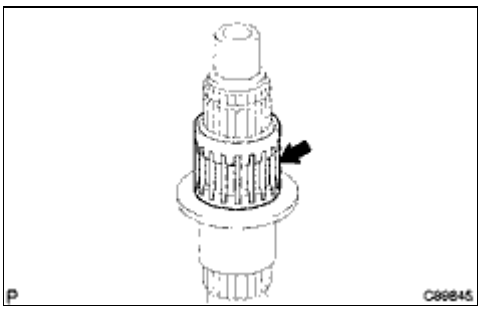
Make sure that the No. 2 transmission hub sleeve and No. 2 transmission clutch hub are oriented in the correct direction.

(b) Apply gear oil to the sliding part of the No. 2 transmission hub sleeve, and install it onto the No. 2 transmission clutch hub.



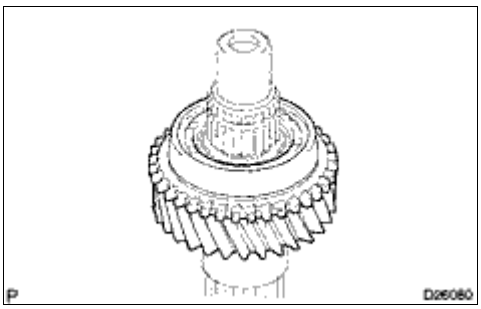
2. INSTALL 3RD GEAR NEEDLE ROLLER BEARING

(a) Apply gear oil to the 3rd gear needle roller bearing, and install it onto the output shaft.



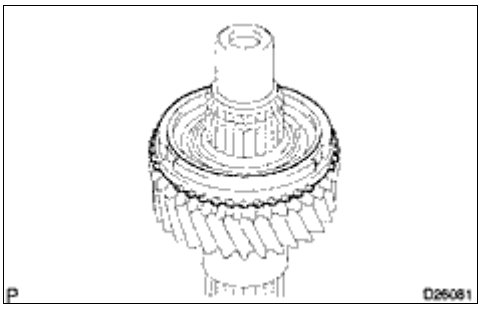
3. INSTALL 3RD GEAR

(a) Apply gear oil to the 3rd gear, and install it onto the output shaft.



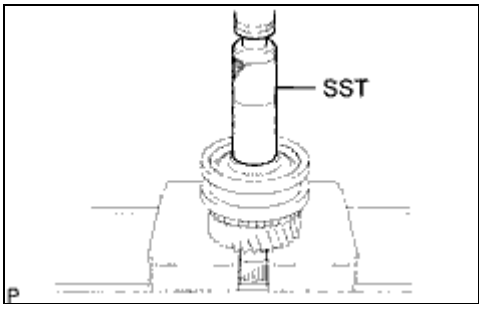
4. INSTALL NO. 2 SYNCHRONIZER RING

(a) Apply gear oil to the No. 2 synchronizer ring, and install it onto the 3rd gear.



5. INSTALL NO. 2 TRANSMISSION CLUTCH HUB

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(a) Using SST, install the No. 2 transmission clutch hub onto the output shaft.

SST: 09608-06041

NOTICE:

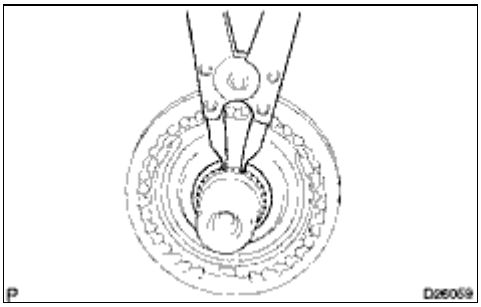
- Install it with the No. 2 synchronizer ring key groove aligned with the shifting key position.
- Make sure that the 3rd gear rotates smoothly.

(b) Select the correct clutch hub shaft snap ring so that the clearance between the No. 2 transmission clutch hub and shaft snap ring thrust is within the specified values. Then install it onto the output shaft.

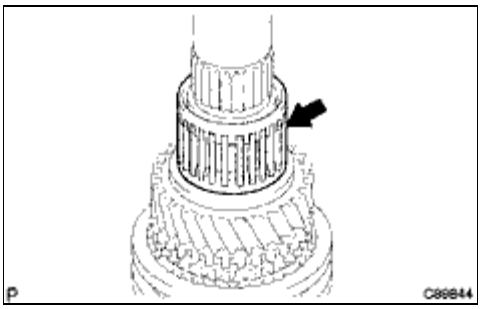
Standard clearance:
0.1 mm (0.00394 in.) or less

NOTICE:

Do not damage the sliding surface of the bearing.



MARK	THICKNESS MM (IN.)
A	1.80 to 1.85 (0.0709 to 0.0728)
B	1.85 to 1.90 (0.0728 to 0.0748)
C	1.90 to 1.95 (0.0748 to 0.0768)
D	1.95 to 2.00 (0.0768 to 0.0787)
E	2.00 to 2.05 (0.0787 to 0.0807)
F	2.05 to 2.10 (0.0807 to 0.0827)
G	2.10 to 2.15 (0.0827 to 0.0846)



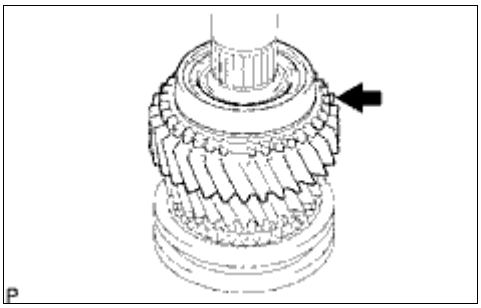
6. INSTALL 2ND GEAR NEEDLE ROLLER BEARING

(a) Apply gear oil to the 2nd gear needle roller bearing, and install it onto the output shaft.

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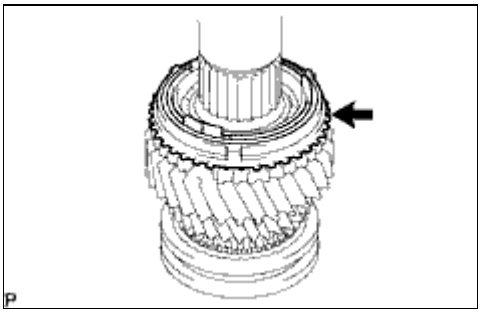
7. INSTALL 2ND GEAR

(a) Apply gear oil to the 2nd gear, and install it onto the output shaft.



8. INSTALL NO. 1 SYNCHRONIZER RING SET

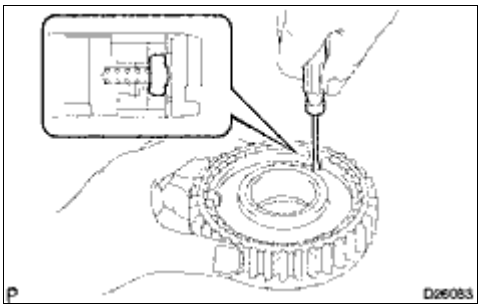
(a) Apply gear oil to the No. 1 synchronizer ring set, and install it onto the 2nd gear.



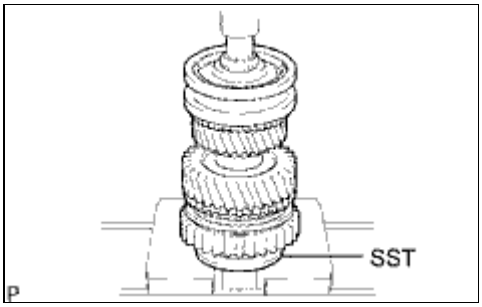
9. INSTALL REVERSE GEAR

(a) Using a screwdriver, install the 3 synchromesh shifting key springs and 3 No.1 synchromesh shifting key onto the No. 1 transmission clutch hub.

(b) Apply gear oil to the reverse gear, and install it onto the No. 1 transmission clutch hub.



10. INSTALL NO. 1 TRANSMISSION CLUTCH HUB



(a) Using SST and a press, install No. 1 transmission clutch hub onto the output shaft.

SST: 09316-60011

09316-00041

NOTICE:

- Perform installation making sure that the No. 1 synchronizer ring key groove and No. 1 synchro-mesh shifting key are in place.
- Make sure that the 1st gear rotates smoothly.

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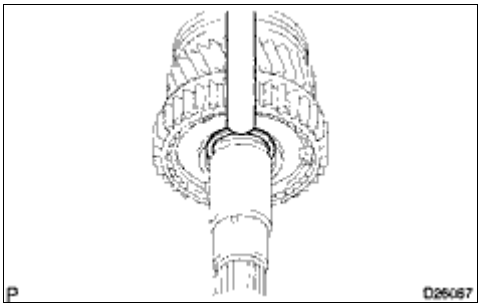
(b) Select the correct bearing shaft snap ring so that the clearance between the No. 1 transmission clutch hub and bearing shaft snap ring is within the specified values. Then install it onto the output shaft.

Standard clearance:
0.1 mm (0.039 in.) or less

NOTICE:

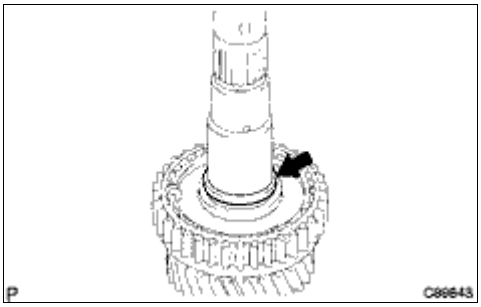
Do not damage the sliding surface of the bearing.

MARK	THICKNESS MM (IN.)
A	2.30 to 2.35 (0.0906 to 0.0925)
B	2.35 to 2.40 (0.0925 to 0.0945)
C	2.40 to 2.45 (0.0945 to 0.0965)
D	2.45 to 2.50 (0.0965 to 0.0984)
E	2.50 to 2.55 (0.0984 to 0.1004)
F	2.55 to 2.60 (0.1004 to 0.1024)
G	2.60 to 2.65 (0.1024 to 0.1043)



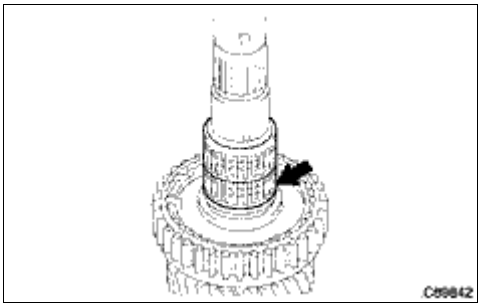
11. INSTALL 1ST GEAR BEARING SPACER

(a) Apply gear oil to the 1st gear bearing spacer, and install it onto the output shaft.



12. INSTALL 1ST GEAR NEEDLE ROLLER BEARING

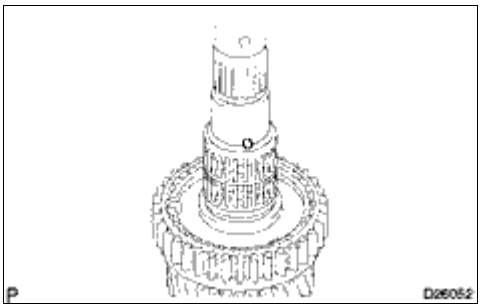
(a) Apply gear oil to the 1st gear needle roller bearing, and install it onto the output shaft.



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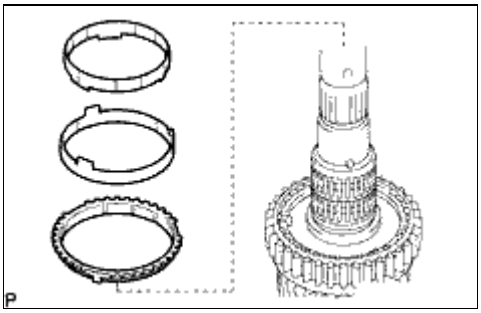
13. INSTALL 1ST GEAR THRUST WASHER PIN OR BALL

(a) Install the 1st gear thrust washer pin onto the output shaft.



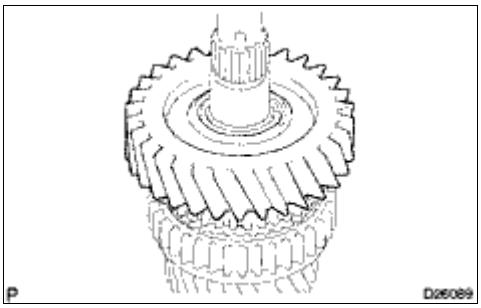
14. INSTALL NO. 1 SYNCHRONIZER RING SET

(a) Apply gear oil to the No. 1 synchronizer ring, and install it onto the output shaft.



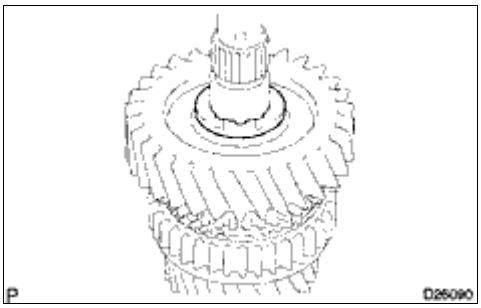
15. INSTALL 1ST GEAR

(a) Apply gear oil to the 1st gear, and install it onto the output shaft.



16. INSTALL 1ST GEAR THRUST WASHER

(a) Apply gear oil to the 1st gear thrust washer, and install it onto the output shaft.



17. INSTALL OUTPUT SHAFT CENTER BEARING

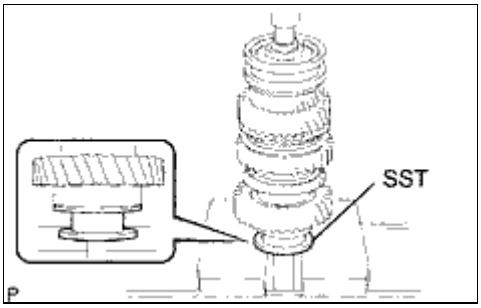
(a) Using SST and a press, install a new output shaft center bearing onto the output shaft.

SST: 09316-60011

09316-00031

NOTICE:

Install it with the snap ring groove of the bearing facing to the rear side.



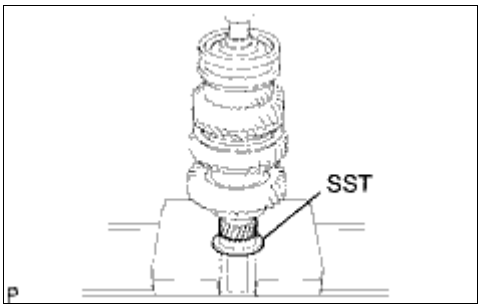
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18. INSTALL 5TH GEAR

(a) Using SST and a press, install the 5th gear onto the output shaft.

SST: 09316-60011

09316-00031



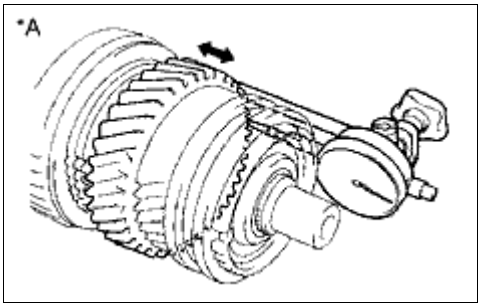
NOTICE:

- Check that the 5th gear is fitted into the spline of the output shaft before installing.
- Face the convex part of the gear to the front side.

19. INSPECT 1ST GEAR THRUST CLEARANCE

Text in Illustration

*A	1st



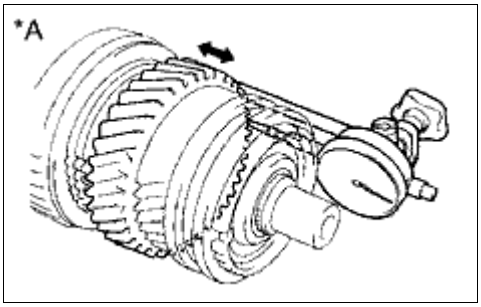
(a) Using a dial indicator, measure the 1st gear thrust clearance.

Standard clearance:
0.20 to 0.45 mm (0.00788 to 0.0177 in.)

20. INSPECT 2ND GEAR THRUST CLEARANCE

Text in Illustration

*A	2nd



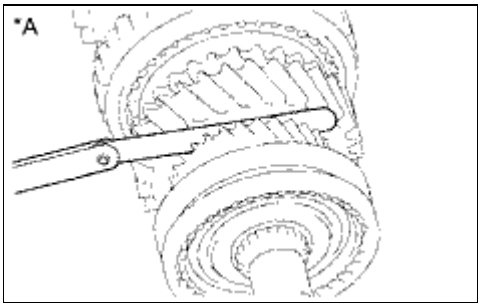
(a) Using a dial indicator, measure the 2nd gear thrust clearance.

Standard clearance:
0.10 to 0.25 mm (0.00394 to 0.00984 in.)

21. INSPECT 3RD GEAR THRUST CLEARANCE

Text in Illustration

*A	3rd



(a) Using a feeler gauge, measure the 3rd gear thrust clearance.

Standard clearance:
0.10 to 0.25 mm (0.00394 to 0.00984 in.)

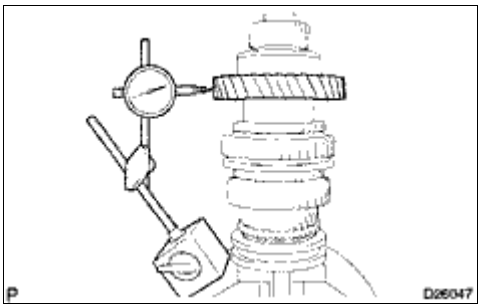
cardiagn.com

22. INSPECT 1ST GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 1st gear radial clearance.

Standard clearance:
0.020 to 0.073 mm (0.000785 to 0.00287 in)

If the clearance is not within the specified values, replace the 1st gear needle roller bearing with a new one.

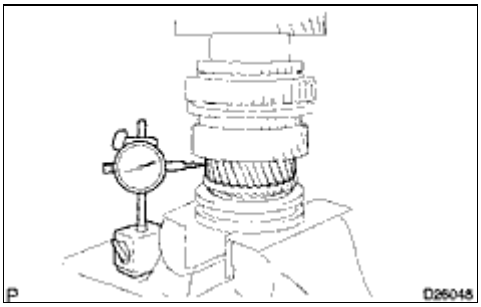


23. INSPECT 2ND GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 2nd gear radial clearance.

Standard clearance:
0.015 to 0.068 mm (0.000591 to 0.00267 in.)

If the clearance is not within the specified values, replace the 2nd gear needle roller bearing with a new one.

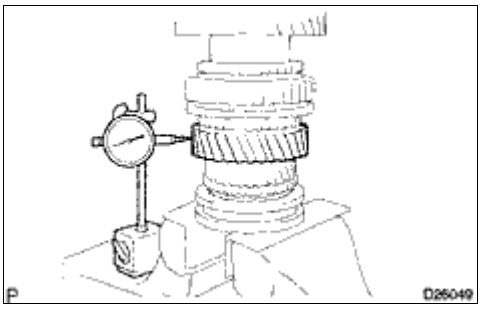


24. INSPECT 3RD GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 3rd gear radial clearance.

Standard clearance:
0.015 to 0.068 mm (0.000591 to 0.00267 in.)

If the clearance is not within the specified values, replace the 3rd gear needle roller bearing with a new one.

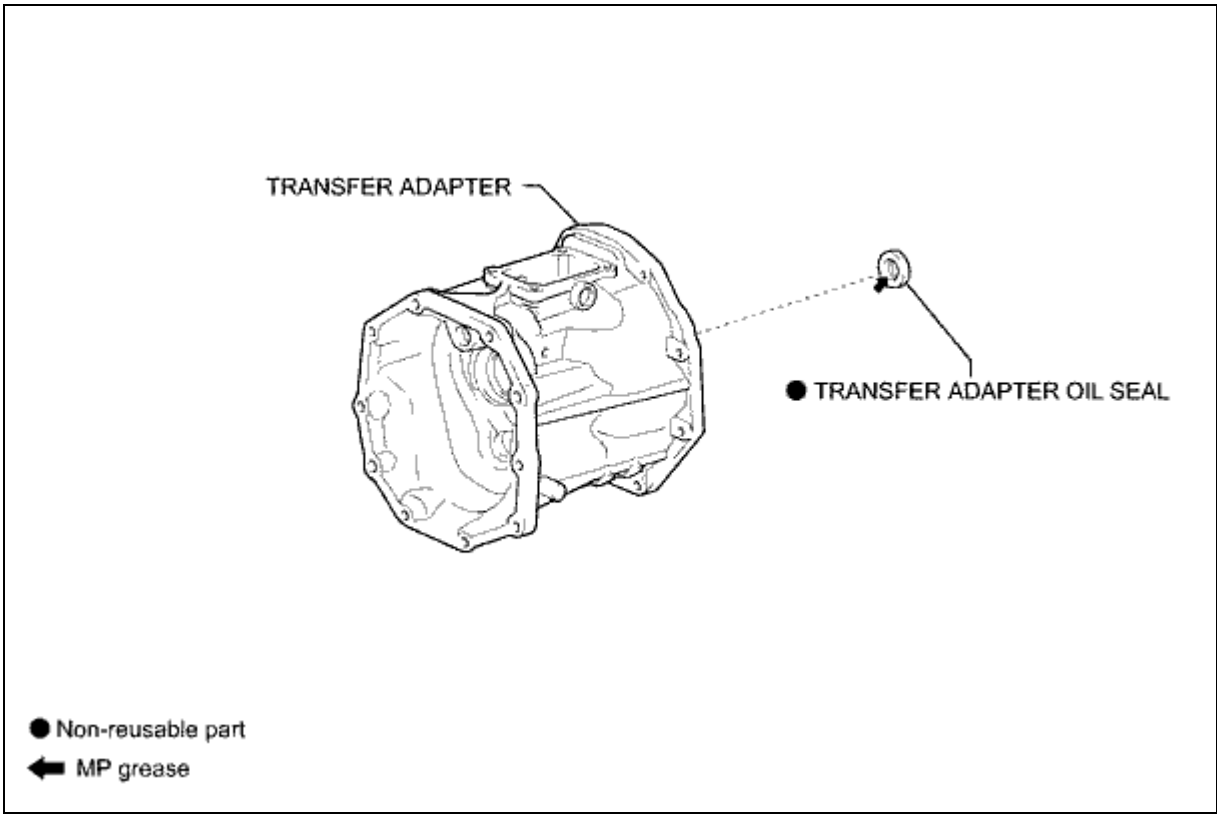


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005WA1000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: TRANSFER ADAPTER OIL SEAL: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION

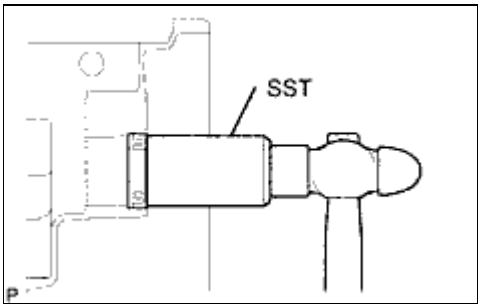


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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177G00AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: TRANSFER ADAPTER OIL SEAL: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSFER ADAPTER OIL SEAL



(a) Using SST and a hammer, tap in a new oil seal.

SST: 09223-00010

Drive in depth:

45.4 to 46.4 mm (1.788 to 1.826 in.)

NOTICE:

Be careful not to damage the oil seal.

(b) Coat the lip of the oil seal with MP grease.

2. INSTALL TRANSFER ASSEMBLY

INFO

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177H00AX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: R156F MANUAL TRANSMISSION: TRANSFER ADAPTER OIL SEAL: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

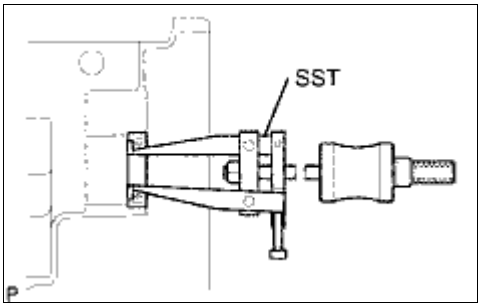
1. REMOVE TRANSFER ASSEMBLY

INFO

2. REMOVE TRANSFER ADAPTER OIL SEAL

(a) Using SST, remove the transfer adapter oil seal.

SST: 09308-00010



NOTICE:

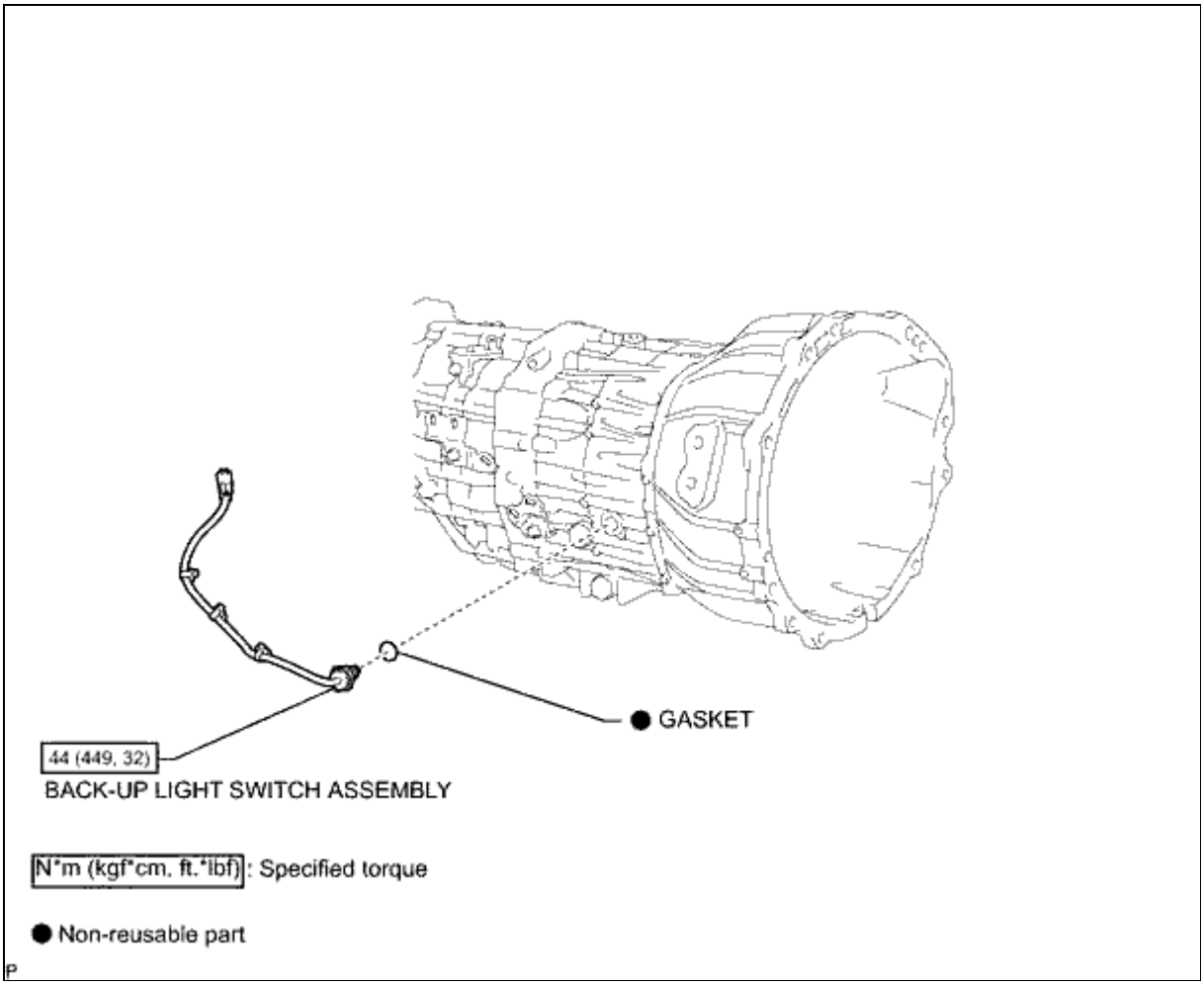
Do not damage the oil seal fitted surface of the transfer adapter.

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005V03000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000005V02000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: INSPECTION; 2016 MY Tacoma [08/2015 -]		

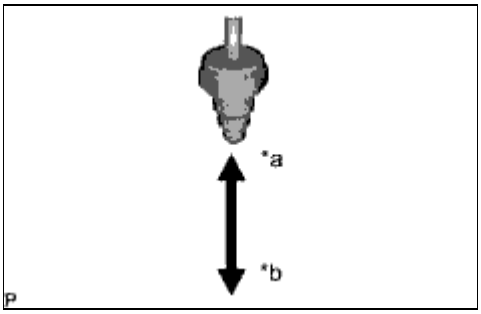
INSPECTION

1. INSPECT BACK-UP LIGHT SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Text in Illustration

*a	Pushed
*b	Released



Standard Resistance:

SWITCH CONDITION	SPECIFIED CONDITION
Pushed	Below 1 Ω
Released	10 kΩ or higher

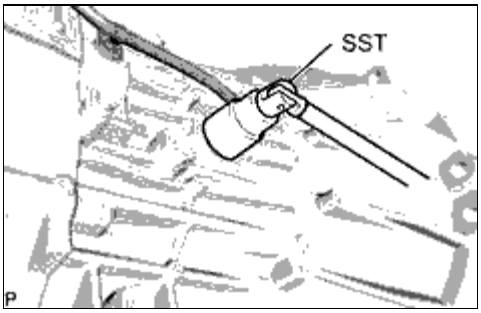
If the result is not as specified, replace the back-up light switch assembly.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000005V01000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL BACK-UP LIGHT SWITCH ASSEMBLY



(a) Using SST, install a new gasket and the back-up light switch assembly to the transmission case.

SST: 09817-16011

Torque:

44 N·m {449 kgf·cm, 32ft·lbf}

(b) Attach the 4 clamps.

(c) Connect the connector.

2. INSTALL SHIFT LEVER BOOT ASSEMBLY INFO

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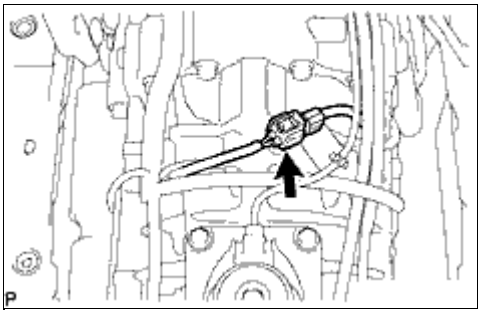
Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000005V04000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: BACK-UP LIGHT SWITCH: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

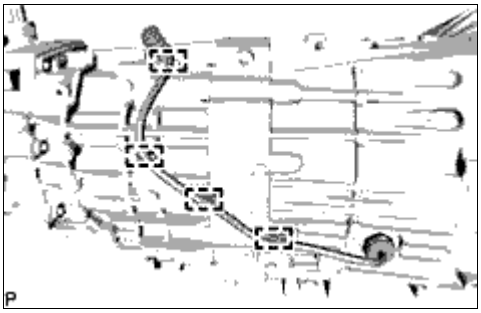
1. REMOVE SHIFT LEVER BOOT ASSEMBLY INFO

2. REMOVE BACK-UP LIGHT SWITCH ASSEMBLY

(a) Disconnect the connector.

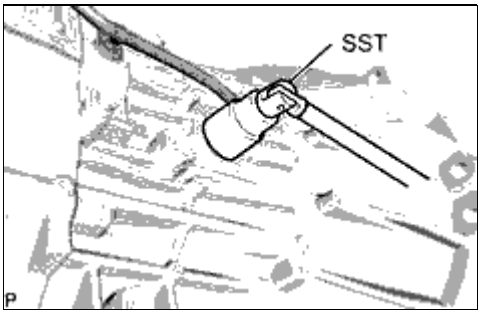


(b) Detach the 4 clamps.



(c) Using SST, remove the back-up light switch assembly and gasket from the transmission case.

SST: 09817-16011

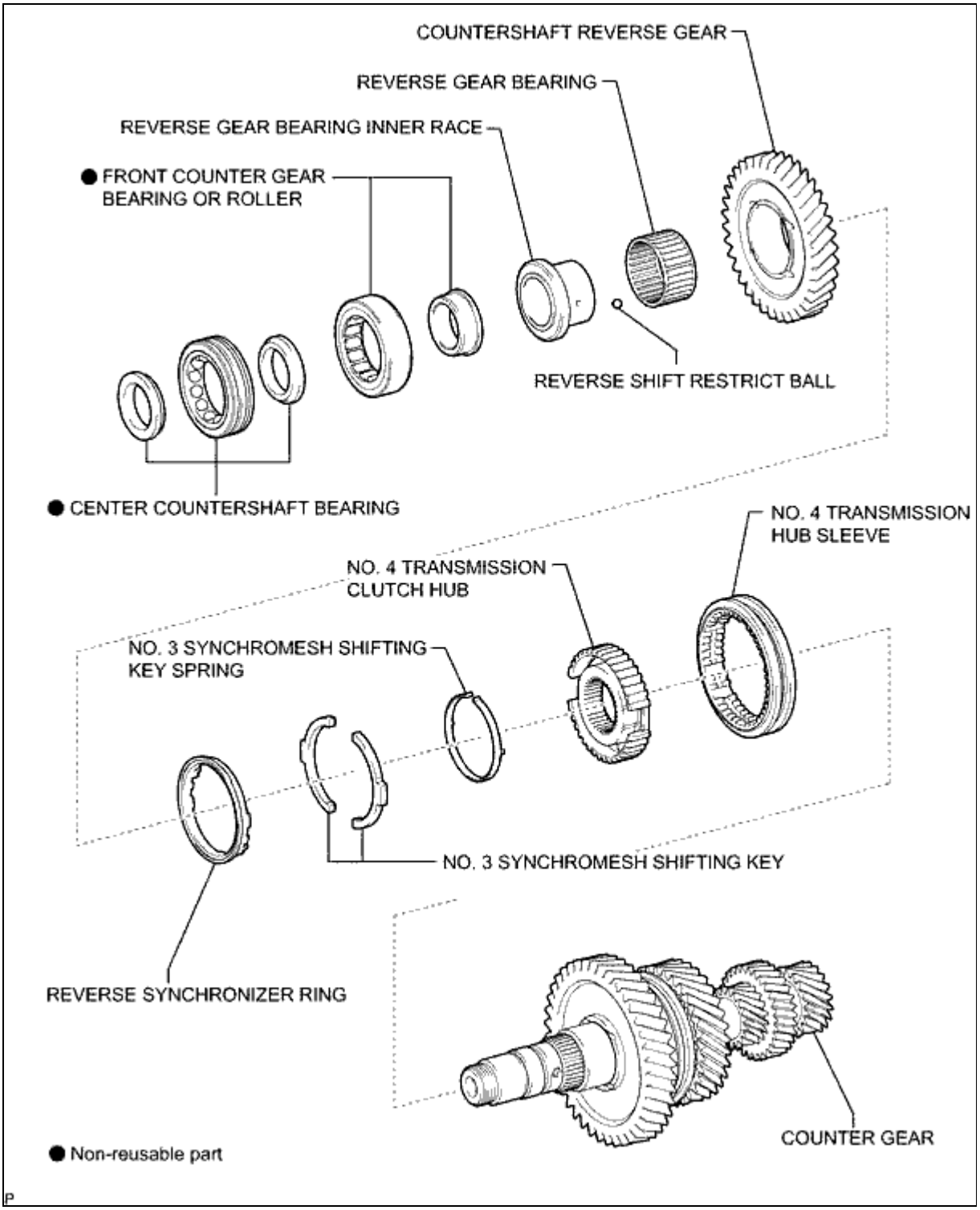


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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000001781016X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: COUNTER GEAR: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

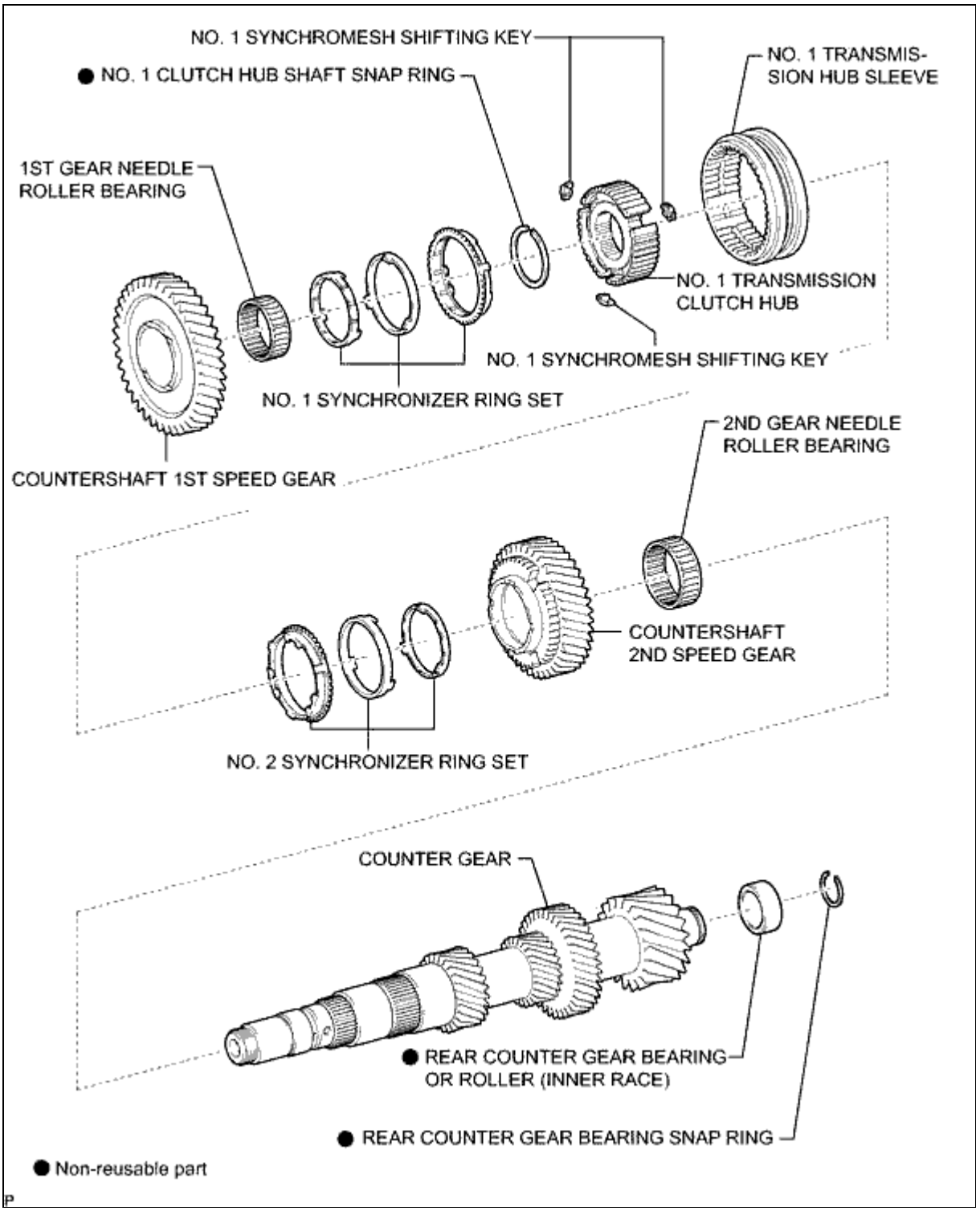
COMPONENTS

ILLUSTRATION



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ILLUSTRATION



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000001782016X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: COUNTER GEAR: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

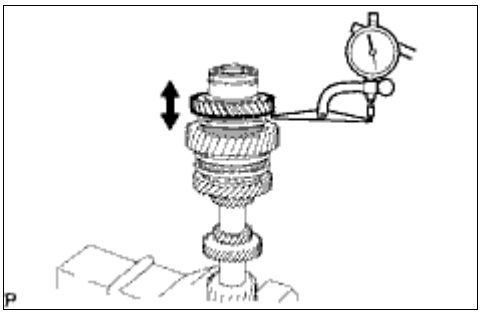
DISASSEMBLY

1. INSPECT COUNTERSHAFT REVERSE GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the countershaft reverse gear thrust clearance.

Standard clearance:
0.150 to 0.300 mm (0.0060 to 0.0118 in.)

If the clearance is outside the specification, replace the countershaft reverse gear, reverse gear bearing inner race or No. 4 transmission clutch hub.



HINT:

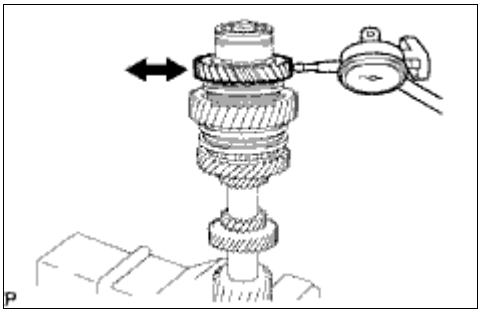
Replace the part or parts determined to be the most likely cause of the problem.

2. INSPECT COUNTERSHAFT REVERSE GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the countershaft reverse gear radial clearance.

Standard clearance:
0.015 to 0.065 mm (0.0006 to 0.0026 in.)

If the clearance is outside the specification, replace the countershaft reverse gear, reverse gear bearing inner race or needle roller bearing.



HINT:

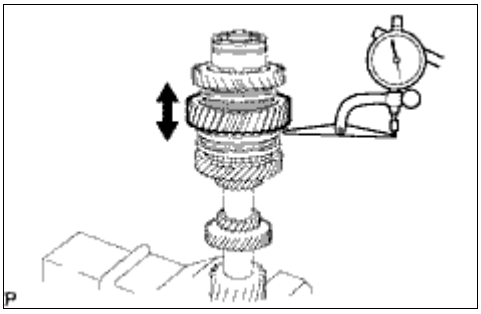
Replace the part or parts determined to be the most likely cause of the problem.

3. INSPECT COUNTERSHAFT 1ST SPEED GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the countershaft 1st speed gear thrust clearance.

Standard clearance:
0.150 to 0.480 mm (0.0060 to 0.0188 in.)

If the clearance is outside the specification, replace the countershaft 1st speed gear, clutch hub or counter gear.



HINT:

Replace the part or parts determined to be the most likely cause of the problem.

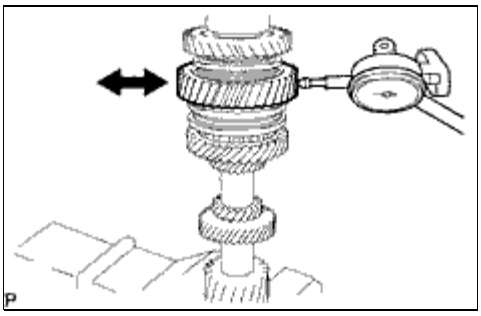
4. INSPECT COUNTERSHAFT 1ST SPEED GEAR RADIAL CLEARANCE

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(a) Using a dial indicator, measure the countershaft 1st speed gear radial clearance.

Standard clearance:
0.015 to 0.067 mm (0.0006 to 0.0026 in.)

If the clearance is outside the specification, replace the countershaft 1st speed gear, 1st gear needle roller bearing or shaft.



HINT:

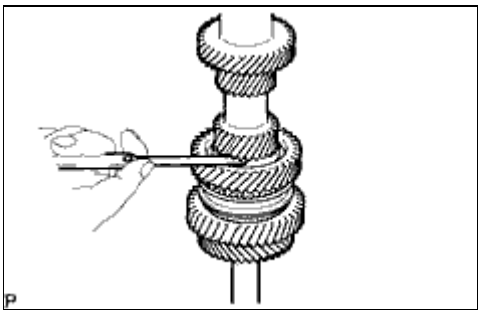
Replace the part or parts determined to be the most likely cause of the problem.

5. INSPECT COUNTERSHAFT 2ND SPEED GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the countershaft 2nd speed gear thrust clearance.

Standard clearance:
0.150 to 0.480 mm (0.0060 to 0.0188 in.)

If the clearance is outside the specification, replace the countershaft 2nd speed gear, clutch hub or counter gear.



HINT:

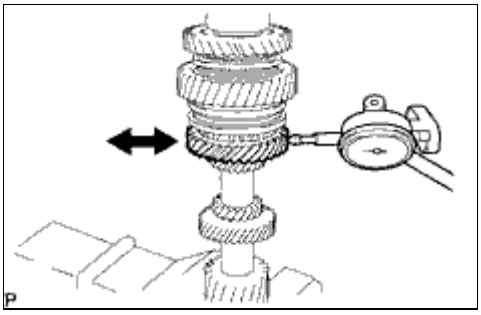
Replace the part or parts determined to be the most likely cause of the problem.

6. INSPECT COUNTERSHAFT 2ND SPEED GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the countershaft 2nd speed gear radial clearance.

Standard clearance:
0.015 to 0.067 mm (0.0006 to 0.0026 in.)

If the clearance is outside the specification, replace the countershaft 2nd speed gear, 2nd gear needle roller bearing or shaft.



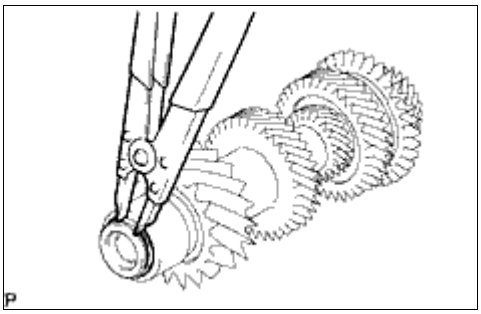
HINT:

Replace the part or parts determined to be the most likely cause of the problem.

7. REMOVE REAR COUNTER GEAR BEARING SNAP RING

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(a) Using a snap ring expander, remove the rear counter gear bearing snap ring from the counter gear.



8. REMOVE REAR COUNTER GEAR BEARING OR ROLLER

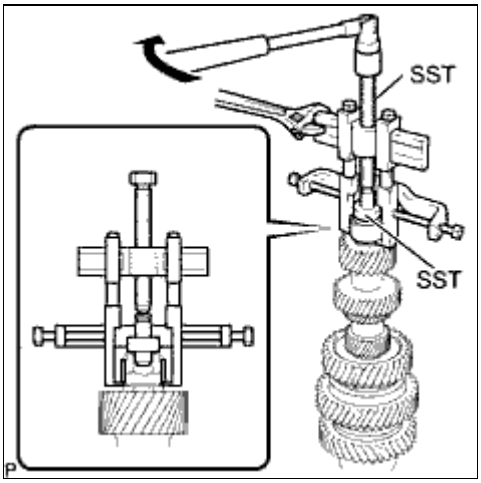
(a) Using SST, remove the rear counter gear bearing or roller (inner races) from the counter gear.

SST: 09950-40011

09951-04010
09952-04010
09953-04010
09954-04010
09955-04071
09957-04010
09958-04011

SST: 09950-60010

09951-00320

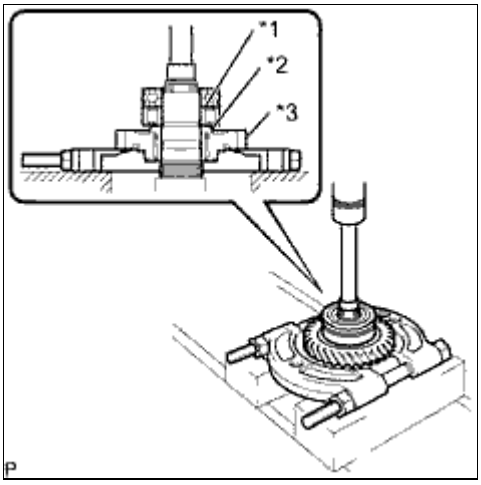


9. REMOVE COUNTERSHAFT REVERSE GEAR

(a) Using SST and a press, remove the front counter gear bearing or roller, center countershaft bearing, reverse gear bearing inner race and countershaft reverse gear from the counter gear.

Text in Illustration

*1	Center Countershaft Bearing (Inner Race)
*2	Reverse Gear Bearing Inner Race
*3	Countershaft Reverse Gear



SST: 09555-55010

SST: 09950-60010

09951-00320

SST: 09950-70010

09951-07100

NOTICE:

Support the counter gear by hand so that it does not fall.

10. REMOVE REVERSE GEAR BEARING

(a) Remove the reverse gear bearing from the counter gear.

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11. REMOVE REVERSE SHIFT RESTRICT BALL

(a) Remove the reverse shift restrict ball from the counter gear.

12. REMOVE REVERSE SYNCHRONIZER RING

(a) Remove the reverse synchronizer ring from the counter gear.

13. REMOVE NO. 3 SYNCHROMESH SHIFTING KEY SPRING

(a) Remove the No. 3 synchromesh shifting key spring from the counter gear.

14. REMOVE NO. 3 SYNCHROMESH SHIFTING KEY

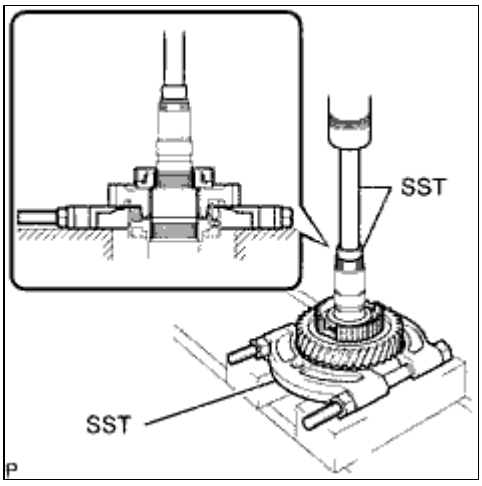
(a) Remove the 2 No. 3 synchromesh shifting keys from the counter gear.

15. REMOVE NO. 4 TRANSMISSION HUB SLEEVE

(a) Remove the No. 4 transmission hub sleeve from the No. 4 transmission clutch hub.

16. REMOVE NO. 4 TRANSMISSION CLUTCH HUB

(a) Using SST and a press, remove the No. 4 transmission clutch hub and countershaft 1st speed gear from the counter gear.



SST: 09555-55010

SST: 09950-60010

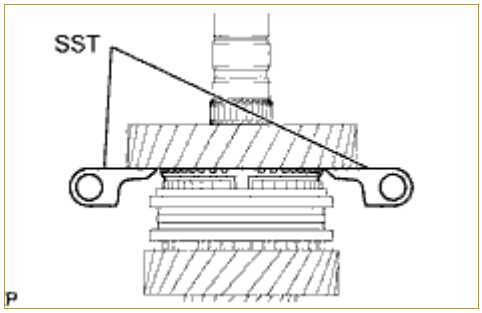
09951-00320

SST: 09950-70010

09951-07100

NOTICE:

- Do not insert SST deep inside the gear, as this may damage the synchronizer ring.



- Use SST in the position shown in the illustration.

17. REMOVE 1ST GEAR NEEDLE ROLLER BEARING

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(a) Remove the 1st gear needle roller bearing from the counter gear.

18. REMOVE NO. 1 SYNCHRONIZER RING SET

(a) Remove the No. 1 synchronizer ring set from the counter gear.

19. REMOVE NO. 1 TRANSMISSION HUB SLEEVE

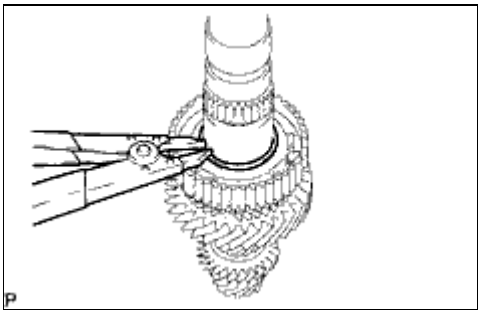
(a) Remove the No. 1 transmission hub sleeve from the No. 1 transmission clutch hub.

20. REMOVE NO. 1 SYNCHROMESH SHIFTING KEY

(a) Remove the 3 No. 1 synchromesh shifting keys from the No. 1 transmission clutch hub.

21. REMOVE NO. 1 CLUTCH HUB SHAFT SNAP RING

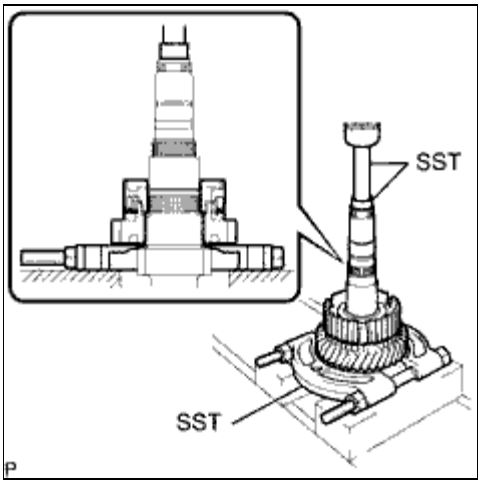
(a) Using a snap ring expander, remove the No. 1 clutch hub shaft snap ring from the counter gear.



22. REMOVE NO. 1 TRANSMISSION CLUTCH HUB

(a) Using SST and a press, remove the countershaft 2nd speed gear, No. 2 synchronizer ring set and No. 1 transmission clutch hub from the counter gear.

SST: 09555-55010
SST: 09950-60010
09951-00320
SST: 09950-70010
09951-07100



23. REMOVE 2ND GEAR NEEDLE ROLLER BEARING

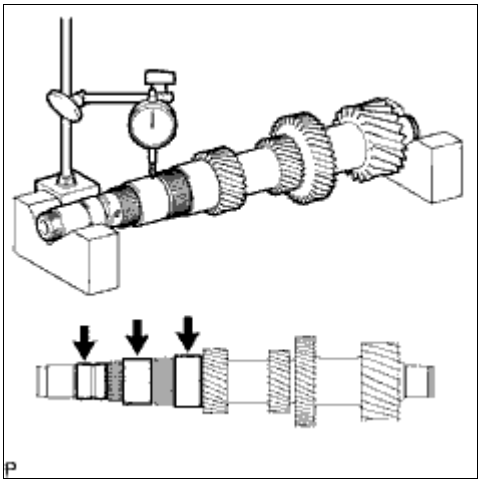
(a) Remove the 2nd gear needle roller bearing from the counter gear.

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000001780016X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: COUNTER GEAR: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT COUNTER GEAR



(a) Using a dial indicator and 2 V-blocks, measure the counter gear runout.

Maximum runout:
0.03 mm (0.00118 in.)

If the runout is more than the maximum, replace the counter gear.

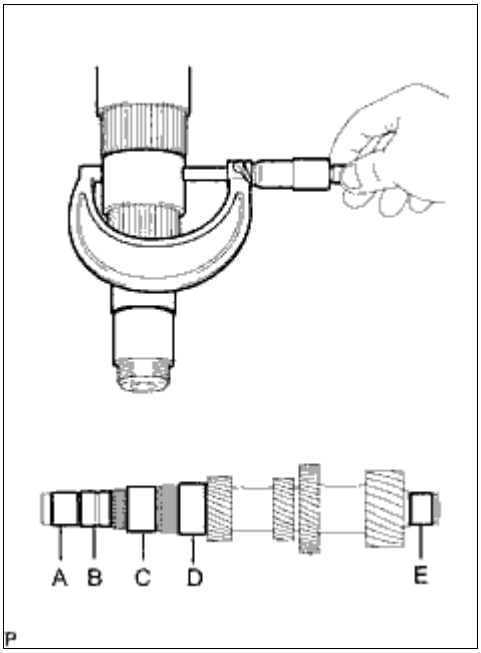
HINT:

Measure the 3 areas shown in the illustration with the counter gear level.

(b) Using a micrometer, measure the journal diameter of each counter gear journal, at the specified positions.

Standard Journal Diameter:

ITEM	SPECIFIED CONDITION
Journal A	35.002 to 35.015 mm (1.3781 to 1.3785 in.)
Journal B	36.985 to 37.000 mm (1.4561 to 1.4566 in.)
Journal C	47.985 to 48.000 mm (1.8892 to 1.8897 in.)
Journal D	53.985 to 54.000 mm (2.1254 to 2.1259 in.)
Journal E	34.002 to 34.015 mm (1.3387 to 1.3391 in.)



Minimum Journal Diameter:

ITEM	SPECIFIED CONDITION
Journal A	35.002 mm (1.3781 in.)
Journal B	36.985 mm (1.4561 in.)
Journal C	47.985 mm (1.8892 in.)
Journal D	53.985 mm (2.1254 in.)
Journal E	34.002 mm (1.3387 in.)

If the journal diameter is less than the minimum, replace the counter gear.

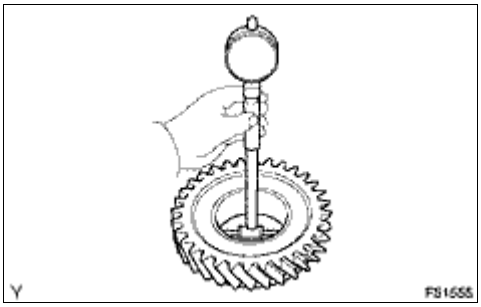
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2. INSPECT COUNTERSHAFT REVERSE GEAR

(a) Using a cylinder gauge, measure the inside diameter of the countershaft reverse gear.

Standard inside diameter:
51.015 to 51.040 mm (2.0085 to 2.0094 in.)
Maximum inside diameter:
51.040 mm (2.0094 in.)

If the inside diameter is more than the maximum, replace the countershaft reverse gear.

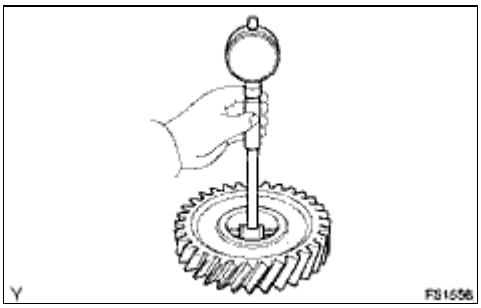


3. INSPECT COUNTERSHAFT 1ST SPEED GEAR

(a) Using a cylinder gauge, measure the inside diameter of the countershaft 1st speed gear.

Standard inside diameter:
54.015 to 54.040 mm (2.1266 to 2.1275 in.)
Maximum inside diameter:
54.040 mm (2.1275 in.)

If the inside diameter is more than the maximum, replace the countershaft 1st speed gear.

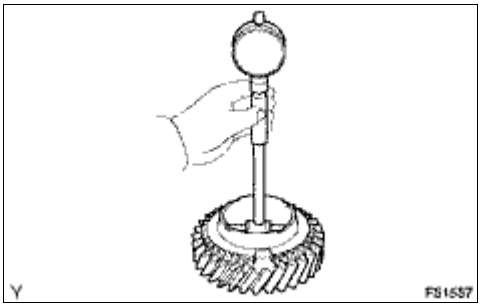


4. INSPECT COUNTERSHAFT 2ND SPEED GEAR

(a) Using a cylinder gauge, measure the inside diameter of the countershaft 2nd speed gear.

Standard inside diameter:
60.015 to 60.040 mm (2.3628 to 2.3637 in.)
Maximum inside diameter:
60.040 mm (2.3637 in.)

If the inside diameter is more than the maximum, replace the countershaft 2nd speed gear.



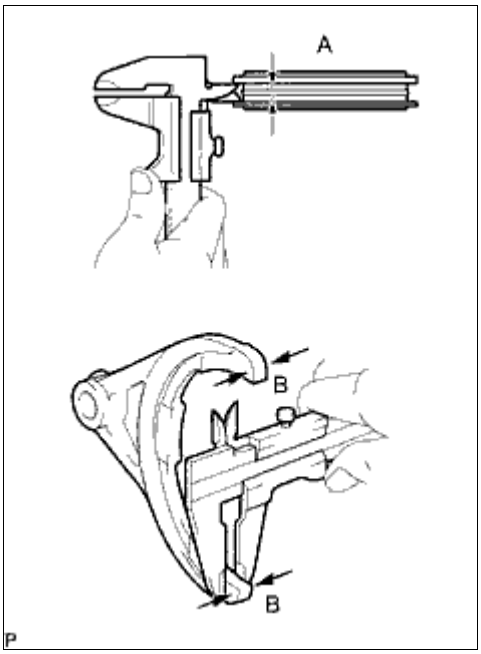
5. INSPECT NO. 4 TRANSMISSION HUB SLEEVE

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(a) Using a vernier caliper, measure the width of the No. 4 transmission hub sleeve groove (A) and the thickness of the 2 claw parts of the No. 4 gear shift fork (B), and calculate the clearance.

Standard clearance (A - B):
0.30 to 0.50 mm (0.012 to 0.019 in.)

If the clearance is outside the specification, replace the No. 4 transmission hub sleeve and No. 4 gear shift fork.

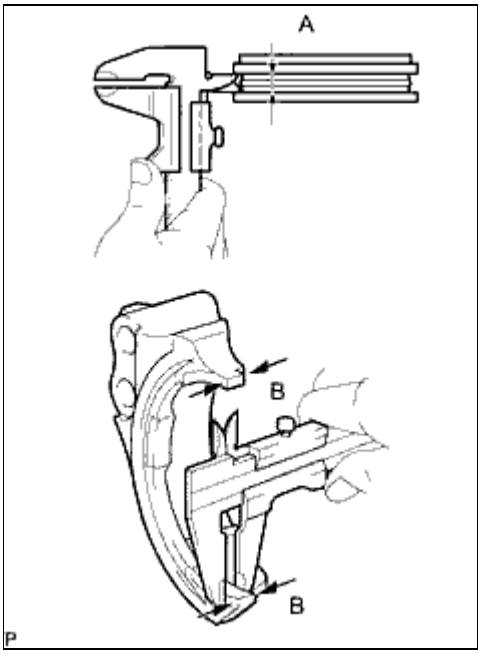


6. INSPECT NO. 1 TRANSMISSION HUB SLEEVE

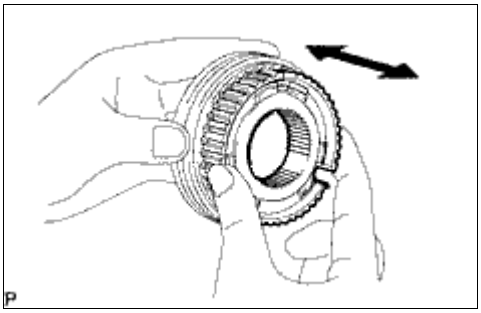
(a) Using a vernier caliper, measure the width of the No. 1 transmission hub sleeve groove (A) and the thickness of the 2 claw parts of the No. 1 gear shift fork (B), and calculate the clearance.

Standard clearance (A - B):
0.15 to 0.35 mm (0.006 to 0.013 in.)

If the clearance is outside the specification, replace the No. 1 transmission hub sleeve and No. 1 gear shift fork.



(b) Check the sliding condition between the No. 1 transmission clutch hub and No. 1 transmission hub sleeve.



(c) Check that the splines of the No. 1 transmission hub sleeve are not worn.

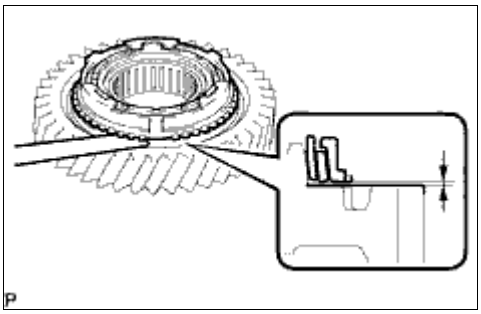
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7. INSPECT NO. 1 SYNCHRONIZER RING SET

(a) Using a feeler gauge, measure the clearance between the No. 1 synchronizer ring set and countershaft 1st speed gear.

Standard clearance:
0.83 to 1.77 mm (0.0327 to 0.0696 in.)
Minimum clearance:
0.83 mm (0.0326 in.)

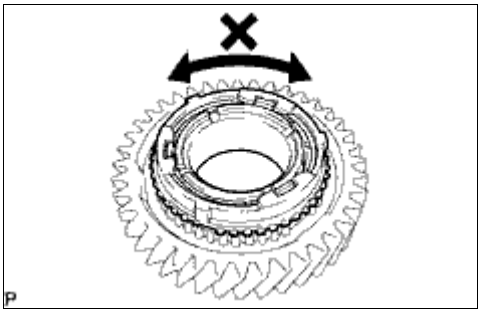
If the clearance is less than the minimum, replace the No. 1 synchronizer ring set.



(b) Coat the countershaft 1st speed gear cone with gear oil.

(c) Check the braking effect of the synchronizer ring.

(1) Turn the synchronizer ring in both directions while pushing it against the countershaft 1st speed gear cone. Check that the ring locks in both directions. If the No. 1 synchronizer ring set turns, replace it.

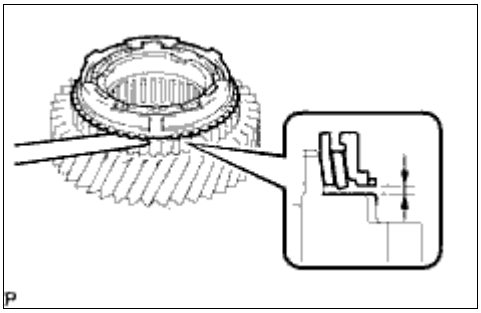


8. INSPECT NO. 2 SYNCHRONIZER RING SET

(a) Using a feeler gauge, measure the clearance between the No. 2 synchronizer ring set and countershaft 2nd speed gear.

Standard clearance:
0.88 to 1.72 mm (0.0347 to 0.0677 in.)
Minimum clearance:
0.88 mm (0.0347 in.)

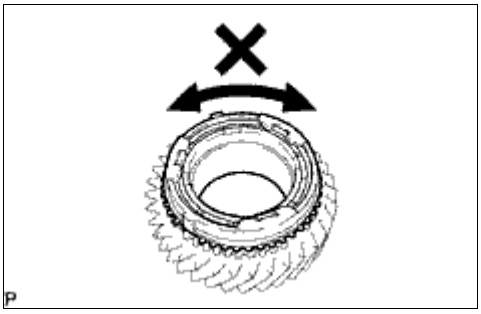
If the clearance is less than the minimum, replace the No. 2 synchronizer ring set.



(b) Coat the countershaft 2nd speed gear cone with gear oil.

(c) Check the braking effect of the No. 2 synchronizer ring set.

(1) Turn the synchronizer ring in both directions while pushing it against the countershaft 2nd speed gear cone. Check that the ring locks in both directions. If the No. 2 synchronizer ring set turns, replace it.



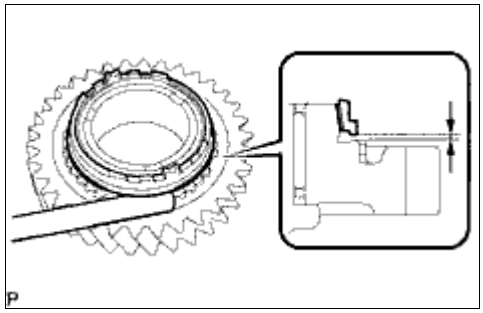
9. INSPECT REVERSE SYNCHRONIZER RING

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(a) Using a feeler gauge, measure the clearance between the No. 2 synchronizer ring set and countershaft 2nd speed gear.

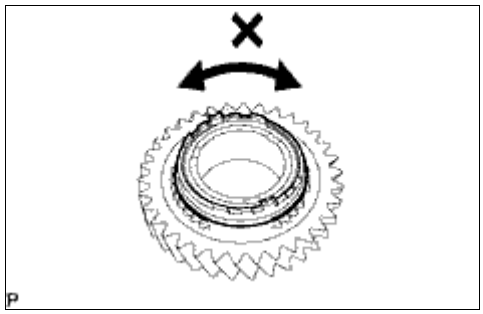
Standard clearance:
0.65 to 1.35 mm (0.0256 to 0.0531 in.)
Minimum clearance:
0.65 mm (0.0256 in.)

If the clearance is less than the minimum, replace the reverse synchronizer ring.



(b) Check the braking effect of the reverse synchronizer ring.

(1) Turn the synchronizer ring in both directions while pushing it against the countershaft reverse gear cone. Check that the ring locks in both directions. If the reverse synchronizer ring turns, replace it.



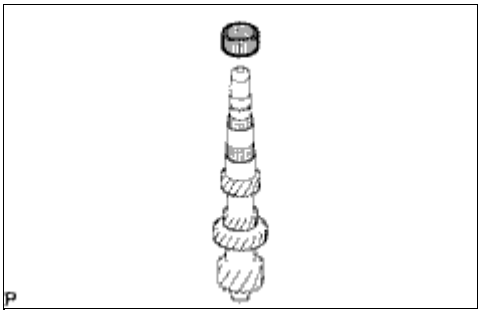
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000001783016X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: COUNTER GEAR: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

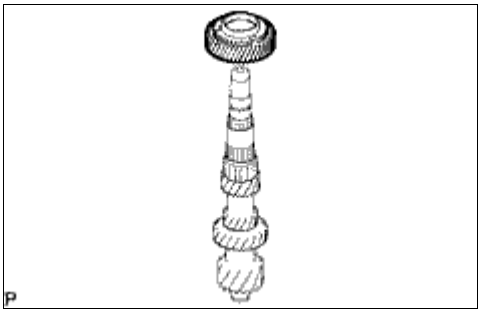
1. INSTALL 2ND GEAR NEEDLE ROLLER BEARING

(a) Coat the 2nd gear needle roller bearing with gear oil, and then install it to the counter gear.



2. INSTALL COUNTERSHAFT 2ND SPEED GEAR

(a) Coat the countershaft 2nd speed gear with gear oil, and then install it to the counter gear.



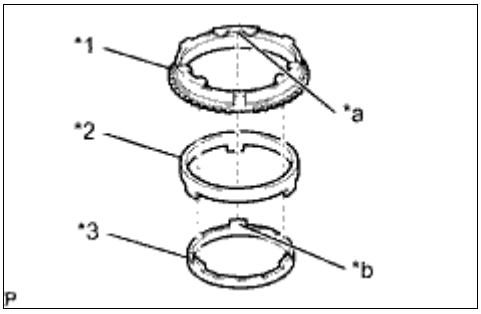
3. INSTALL NO. 2 SYNCHRONIZER RING SET

(a) Coat the No. 2 synchronizer ring with gear oil.

(b) Align the 3 synchronizer rings as shown in the illustration.

Text in Illustration

*1	No. 2 Synchronizer Ring (Outer Ring)
*2	No. 2 Synchronizer Ring (Middle Ring)
*3	No. 2 Synchronizer Ring (Inner Ring)
*a	Cutout
*b	Protrusion

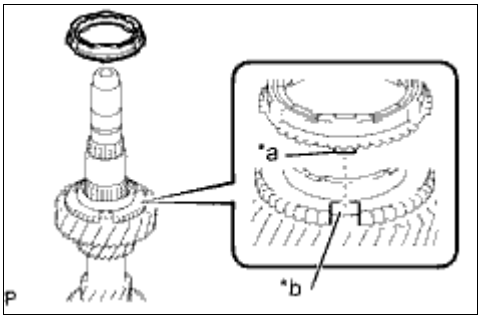


NOTICE:

Align the protrusion of the No. 2 synchronizer inner ring with the cutout of the No. 2 synchronizer outer ring.

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(c) Install the No. 2 synchronizer ring set to the countershaft 2nd speed gear.



Text in Illustration

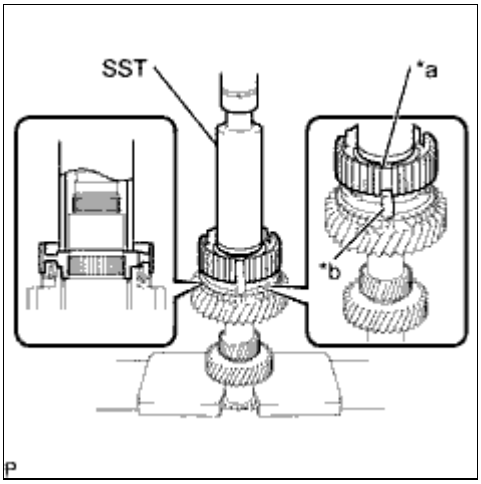
*a	Protrusion
*b	Groove

NOTICE:

Align the protrusion of the No. 2 synchronizer middle ring with the groove of the 2nd gear.

4. INSTALL NO. 1 TRANSMISSION CLUTCH HUB

(a) Using SST and a press, install the No. 1 transmission clutch hub to the counter gear.



Text in Illustration

*a	Groove
*b	Protrusion

SST: 09316-60011

NOTICE:

Align the groove of the No. 1 transmission clutch hub with the protrusion of the No. 2 synchronizer ring set.

NOTICE:

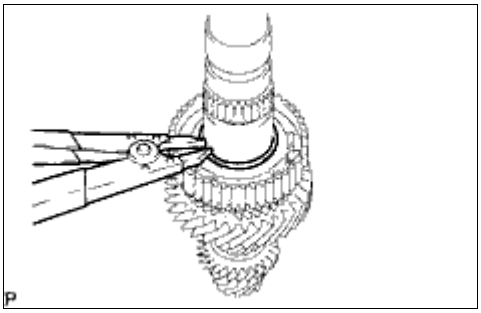
- Pay attention to installation direction of the No. 1 transmission clutch hub.
- Align the groove of the No. 1 transmission clutch hub with the protrusion of the No. 2 synchronizer ring set.

(b) Check that the countershaft 2nd speed gear and No. 2 synchronizer ring set move smoothly.

5. INSTALL NO. 1 CLUTCH HUB SHAFT SNAP RING

(a) Select a new No. 1 clutch hub shaft snap ring that will allow minimal axial play.

Standard clearance:
0.1 mm (0.00394 in.) or less
Standard Snap Ring:



PART NO.	MARK	THICKNESS
90520-T0168	A	2.28 to 2.33 mm (0.0898 to 0.0917 in.)
90520-T0169	B	2.33 to 2.38 mm (0.0918 to 0.09370 in.)
90520-T0170	C	2.38 to 2.43 mm (0.09371 to 0.0956 in.)
90520-T0171	D	2.43 to 2.48 mm (0.0957 to 0.0976 in.)

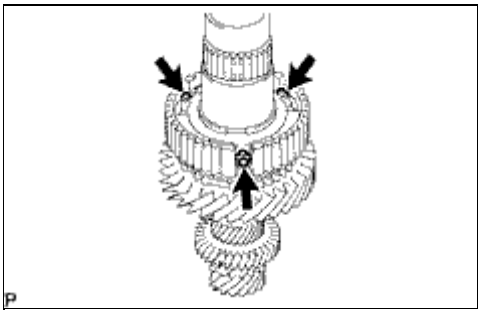
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PART NO.	MARK	THICKNESS
90520-T0172	E	2.48 to 2.53 mm (0.0977 to 0.09960 in.)
90520-T0173	F	2.53 to 2.58 mm (0.09961 to 0.1015 in.)

(b) Using a snap ring expander, install the No. 1 clutch hub shaft snap ring to the counter gear.

6. INSTALL NO. 1 SYNCHROMESH SHIFTING KEY

(a) Install the 3 No. 1 synchromesh shifting keys to the No. 1 transmission clutch hub.

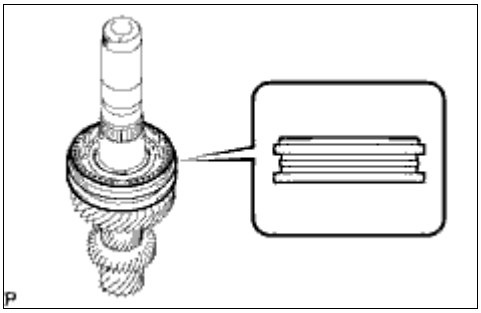


7. INSTALL NO. 1 TRANSMISSION HUB SLEEVE

(a) Install the No. 1 transmission clutch hub to the No. 1 transmission clutch hub sleeve.

NOTICE:

Pay attention to installation direction of the No. 1 transmission hub sleeve.



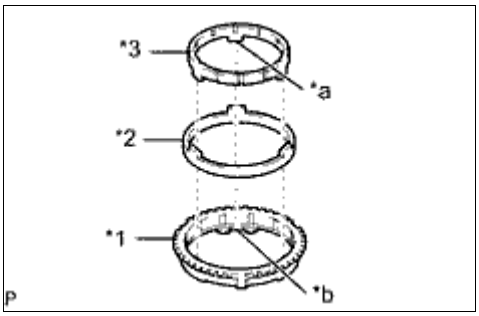
8. INSTALL NO. 1 SYNCHRONIZER RING SET

(a) Coat the No. 2 synchronizer ring with gear oil.

(b) Align the 3 synchronizer rings as shown in the illustration.

Text in Illustration

*1	No. 1 Synchronizer Ring (Outer Ring)
*2	No. 1 Synchronizer Ring (Middle Ring)
*3	No. 1 Synchronizer Ring (Inner Ring)
*a	Protrusion
*b	Cutout

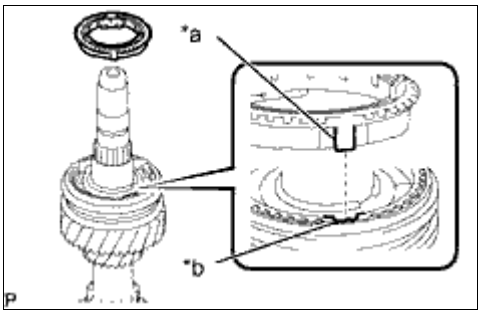


NOTICE:

Align the protrusion of the No. 1 synchronizer inner ring with the cutout of the No. 1 synchronizer outer ring.

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(c) Install the No. 1 synchronizer ring set to the No. 1 transmission clutch hub.



Text in Illustration

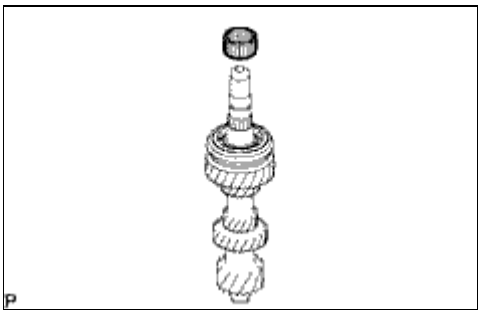
*a	Protrusion
*b	Cutout

NOTICE:

Align the protrusion of the No. 1 synchronizer outer ring with the groove of the No. 1 transmission clutch hub.

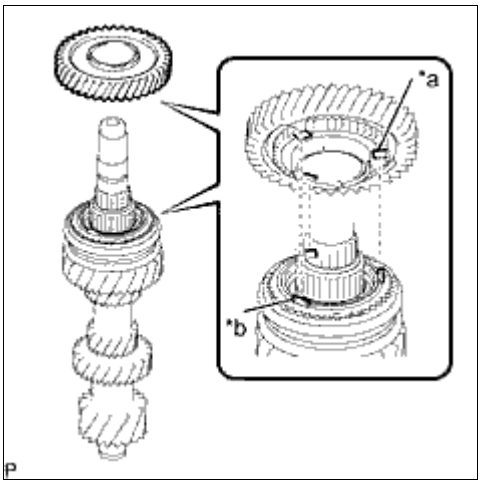
9. INSTALL 1ST GEAR NEEDLE ROLLER BEARING

(a) Coat the 1st gear needle roller bearing with gear oil, and then install it to the counter gear.



10. INSTALL COUNTERSHAFT 1ST SPEED GEAR

(a) Coat the countershaft 1st speed gear with gear oil and install it to the counter gear.



Text in Illustration

*a	Groove
*b	Protrusion

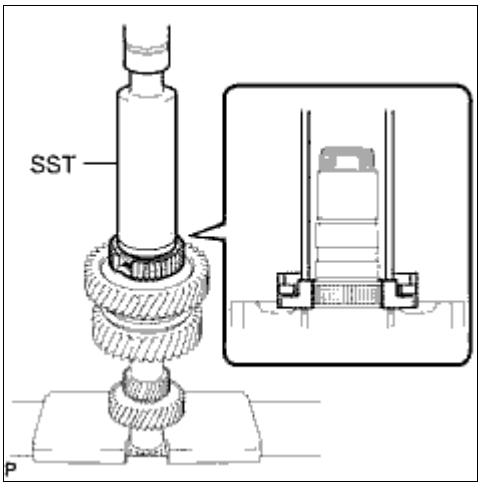
HINT:

Align the groove of the countershaft 1st speed gear with the protrusion of the No. 1 synchronizer ring set.

11. INSTALL NO. 4 TRANSMISSION CLUTCH HUB

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(a) Coat the No. 4 transmission clutch hub with gear oil and install it to the counter gear.



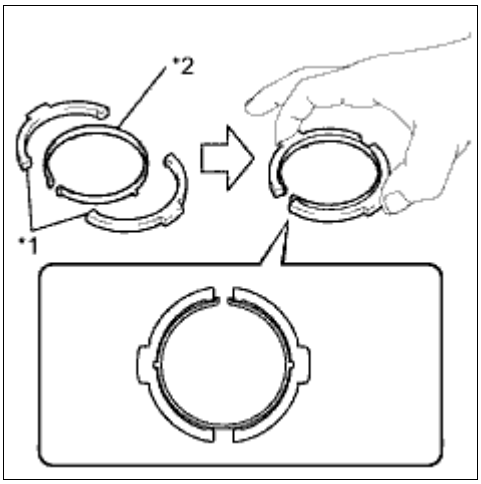
(b) Using SST and a press, install the No. 4 transmission clutch hub.

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12. INSTALL NO. 3 SYNCHROMESH SHIFTING KEY

(a) Install No. 3 synchromesh shifting key.

(1) Pinch and lift up the part as shown in the illustration.



Text in Illustration

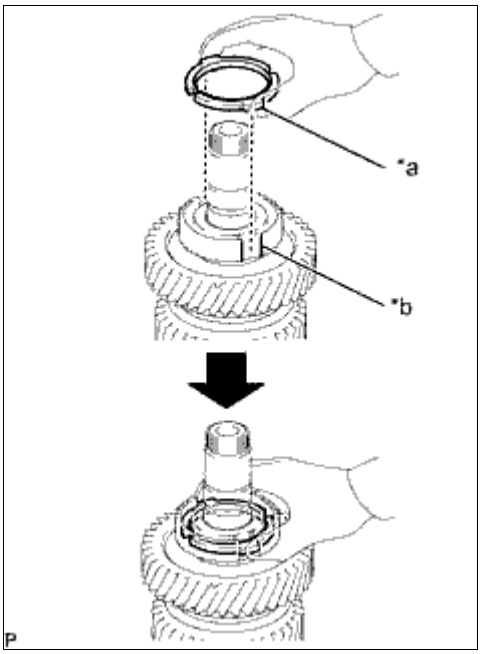
*1	No. 3 Synchromesh Shifting Key
*2	No. 3 Synchromesh Shifting Key Spring

HINT:

Refer to the illustration when installing the No. 3 synchromesh shifting key.

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(2) Install the part to the No. 4 transmission clutch hub as shown in the illustration.



Text in Illustration

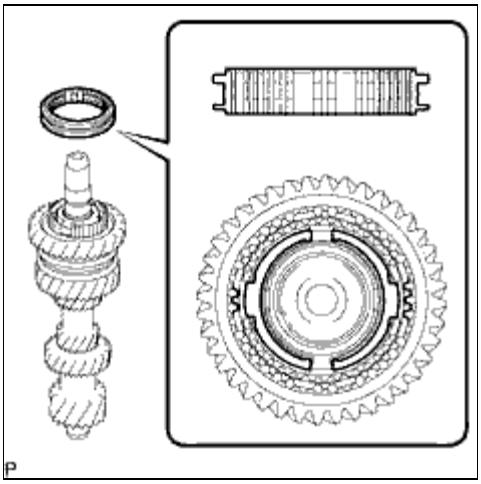
*a	Protrusion
*b	Groove

HINT:

Align the groove of the No. 4 transmission sleeve hub with the protrusion of the No. 3 synchromesh shifting key.

13. INSTALL NO. 4 TRANSMISSION HUB SLEEVE

(a) Coat the No. 4 transmission hub sleeve with gear oil and install it to the No. 4 transmission clutch hub.



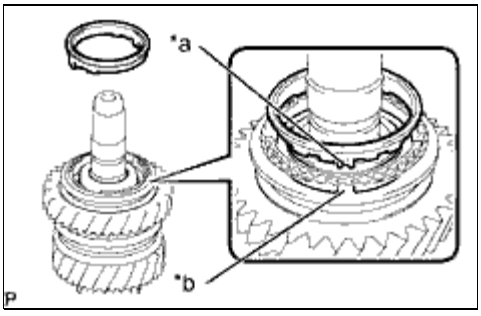
NOTICE:

Pay attention to installation direction of the No. 4 transmission hub sleeve.

14. INSTALL REVERSE SYNCHRONIZER RING

(a) Coat the reverse synchronizer ring with gear oil.

(b) Install reverse synchronizer ring to the No. 4 transmission clutch hub.



Text in Illustration

*a	Protrusion
*b	Groove

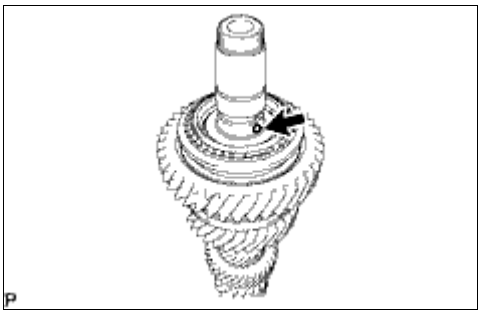
HINT:

Align the groove of the No. 4 transmission hub with the protrusion of the reverse synchronizer ring.

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15. INSTALL REVERSE SHIFT RESTRICT BALL

(a) Install the reverse shift restrict ball to the counter gear.

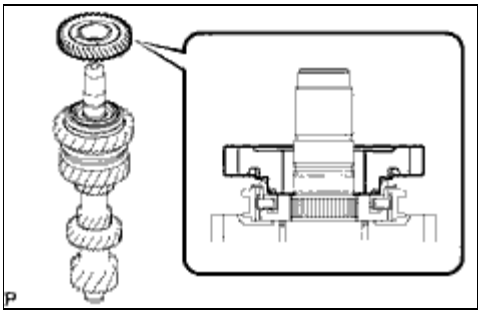


16. INSTALL COUNTERSHAFT REVERSE GEAR

(a) Coat the countershaft reverse gear with gear oil and install it to the counter gear.

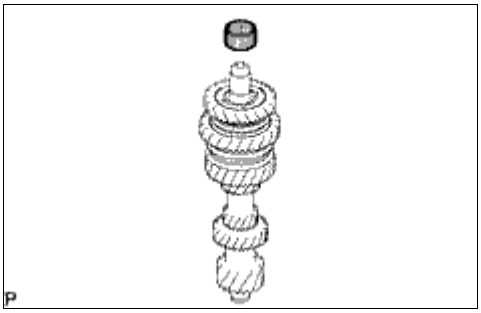
HINT:

Refer to the illustration when installing the countershaft reverse gear.



17. INSTALL REVERSE GEAR BEARING

(a) Coat the reverse gear bearing with gear oil, and then install it to the counter gear.

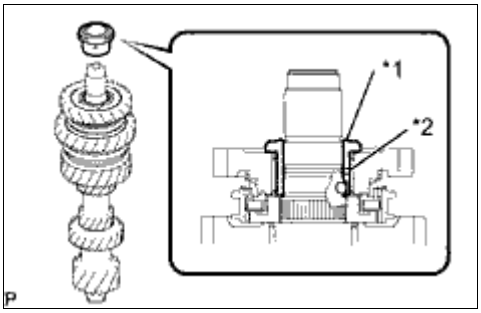


18. INSTALL REVERSE GEAR BEARING INNER RACE

(a) Align the groove of the reverse gear bearing inner race with the reverse shift restrict ball and install the reverse gear bearing inner race.

Text in Illustration

*1	Reverse Gear Bearing Inner Race
*2	Reverse Shift Restrict Ball



19. INSTALL CENTER COUNTERSHAFT BEARING

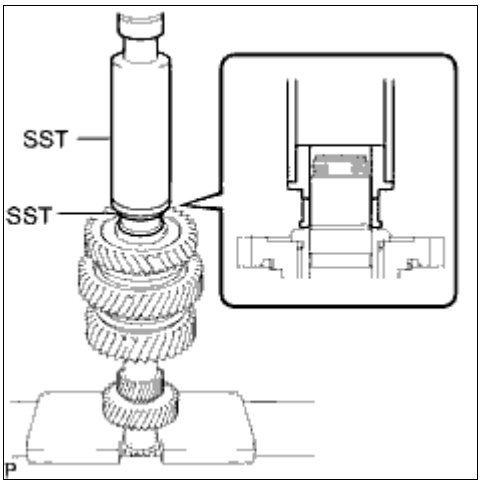
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(a) Using SST and a press, install the center countershaft bearing (inner race) to the counter gear.

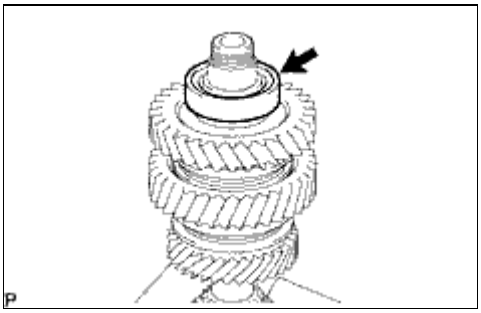
SST: 09316-60011

09316-00011

09316-00071



(b) Coat the center countershaft bearing (outer race) with gear oil, and then install it to the center countershaft bearing (inner race).



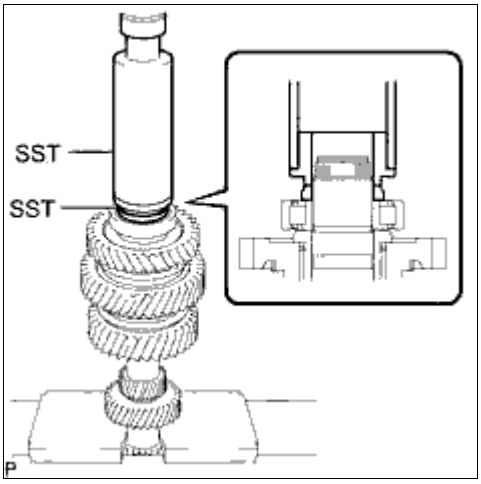
20. INSTALL FRONT COUNTER GEAR BEARING OR ROLLER

(a) Using SST and a press, install the front counter gear bearing or roller (inner race) to the counter gear.

SST: 09316-60011

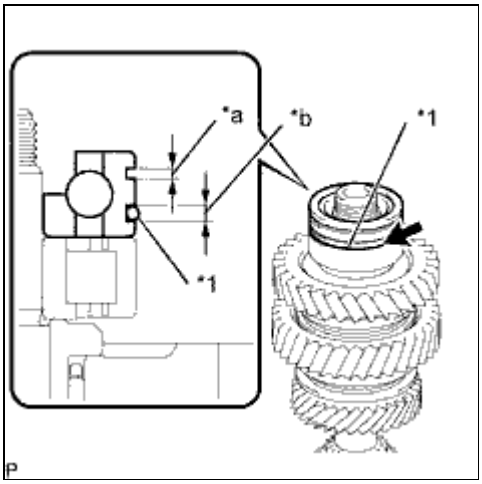
09316-00011

09316-00071



(b) Coat the front counter gear bearing or roller (outer race) with gear oil, and then install it to the front counter gear bearing or roller (inner race).

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Text in Illustration

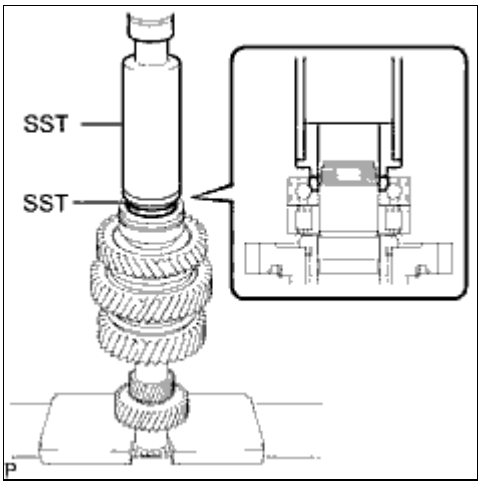
*1	O-ring
*a	2.28 to 2.48 mm (0.090 to 0.097 in.)
*b	2.85 to 3.05 mm (0.113 to 0.120 in.)
➡	Gear Oil

(c) Using SST and a press, install the front counter gear bearing or roller (inner race) to the counter gear.

SST: 09316-60011

09316-00011

09316-00071



21. INSTALL REAR COUNTER GEAR BEARING OR ROLLER

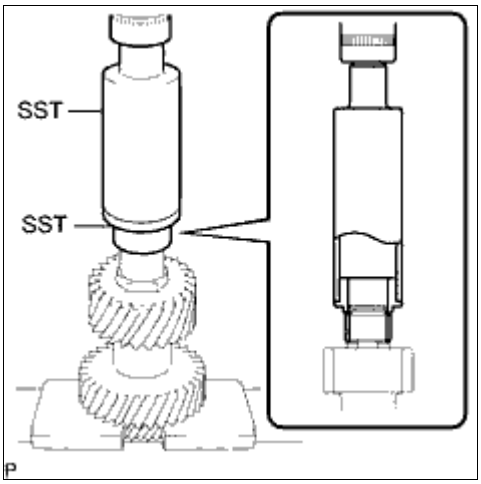
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(a) Using SST and a press, install the rear counter gear bearing or roller (inner race) to the counter gear.

SST: 09316-60011

09316-00011

09316-00071



22. INSTALL REAR COUNTER GEAR BEARING SNAP RING

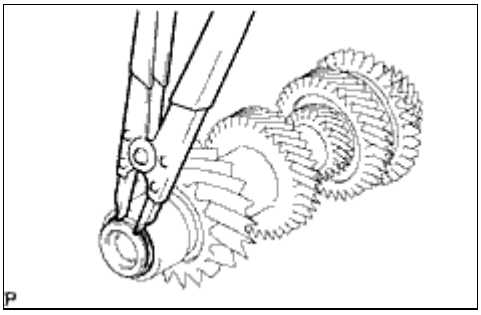
(a) Select a new rear counter gear bearing snap ring that will allow minimal axial play.

Standard clearance:

0.1 mm (0.00394 in.) or less

Standard Snap Ring:

PART NO.	MARK	THICKNESS
90520-T0175	A	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
90520-T0176	B	2.50 to 2.55 mm (0.0985 to 0.1003 in.)
90520-T0177	C	2.55 to 2.60 mm (0.1004 to 0.1023 in.)
90520-T0178	D	2.60 to 2.65 mm (0.1024 to 0.1043 in.)
90520-T0179	E	2.65 to 2.70 mm (0.1044 to 0.1062 in.)
90520-T0180	F	2.70 to 2.75 mm (0.1063 to 0.1082 in.)
90520-T0181	G	2.75 to 2.80 mm (0.1083 to 0.1102 in.)



(b) Using a snap ring expander, install the counter gear rear bearing snap ring to the counter gear.

23. INSPECT COUNTERSHAFT REVERSE GEAR THRUST CLEARANCE INFO

24. INSPECT COUNTERSHAFT REVERSE GEAR RADIAL CLEARANCE INFO

25. INSPECT COUNTERSHAFT 1ST SPEED GEAR THRUST CLEARANCE INFO

26. INSPECT COUNTERSHAFT 1ST SPEED GEAR RADIAL CLEARANCE INFO

27. INSPECT COUNTERSHAFT 2ND SPEED GEAR THRUST CLEARANCE INFO

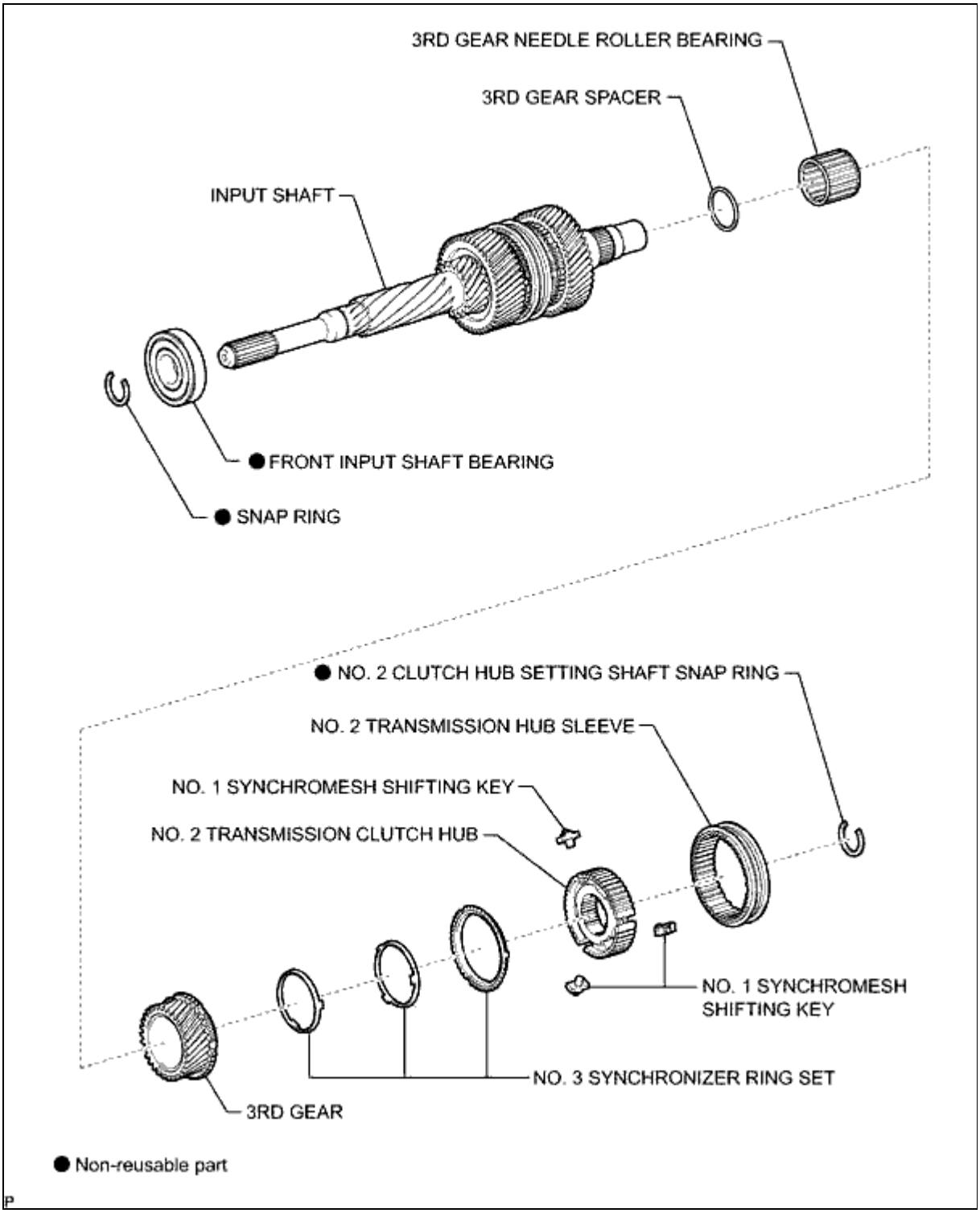
28. INSPECT COUNTERSHAFT 2ND SPEED GEAR RADIAL CLEARANCE INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM00000177T018X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: INPUT SHAFT: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

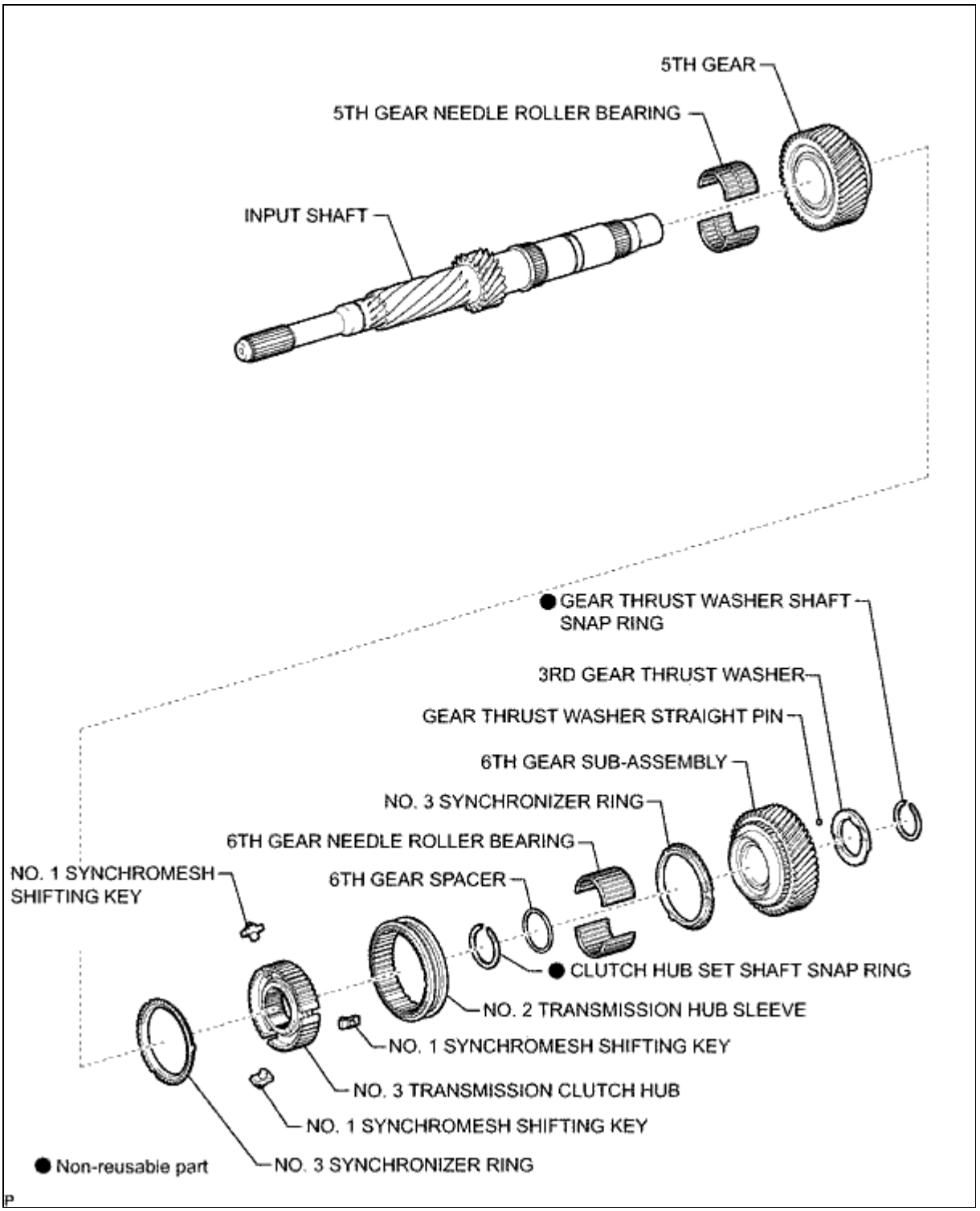
COMPONENTS

ILLUSTRATION



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ILLUSTRATION



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177U01CX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: INPUT SHAFT: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

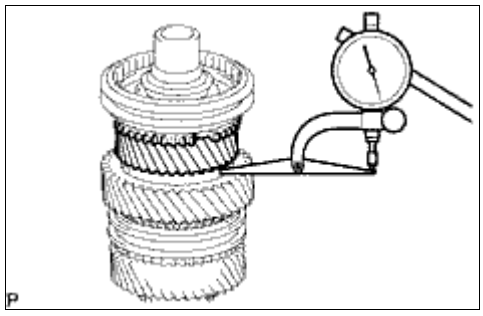
DISASSEMBLY

1. INSPECT 3RD GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 3rd gear thrust clearance.

Standard clearance:
0.200 to 0.490 mm (0.0079 to 0.0192 in.)

If the clearance is outside the specification, replace the 3rd gear, thrust washer, clutch hub or shaft.



HINT:

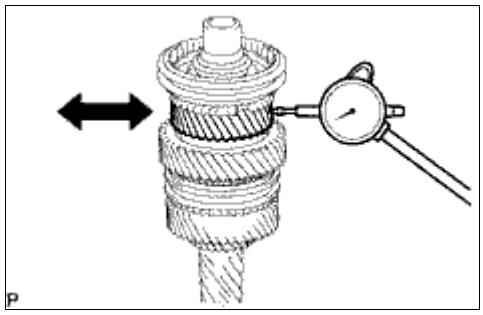
Replace the part or parts determined to be the most likely cause of the problem.

2. INSPECT 3RD GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 3rd gear radial clearance.

Standard clearance:
0.0150 to 0.065 mm (0.0006 to 0.0025 in.)

If the clearance is outside the specification, replace the 3rd gear, 3rd gear needle roller bearing or shaft.



HINT:

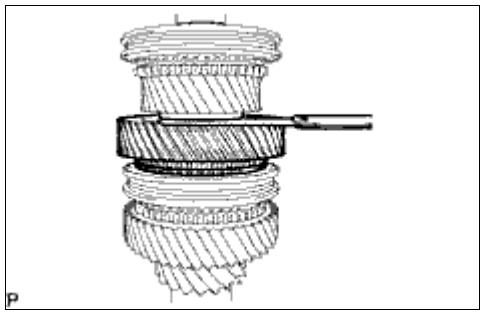
Replace the part or parts determined to be the most likely cause of the problem.

3. INSPECT 6TH GEAR SUB-ASSEMBLY THRUST CLEARANCE

(a) Using a feeler gauge, measure the 6th gear sub-assembly thrust clearance.

Standard clearance:
0.150 to 0.580 mm (0.0059 to 0.0228 in.)

If the clearance is outside the specification, replace the 6th gear sub-assembly, thrust washer, clutch hub or shaft.



HINT:

Replace the part or parts determined to be the most likely cause of the problem.

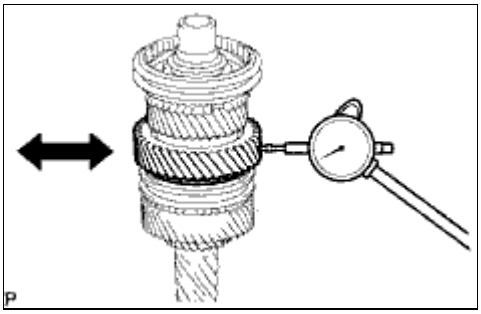
4. INSPECT 6TH GEAR SUB-ASSEMBLY RADIAL CLEARANCE

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(a) Using a dial indicator, measure the 6th gear sub-assembly radial clearance.

Standard clearance:
0.015 to 0.067 mm (0.0006 to 0.0026 in.)

If the clearance is outside the specification, replace the 6th gear sub-assembly, 6th gear needle roller bearing or shaft.



HINT:

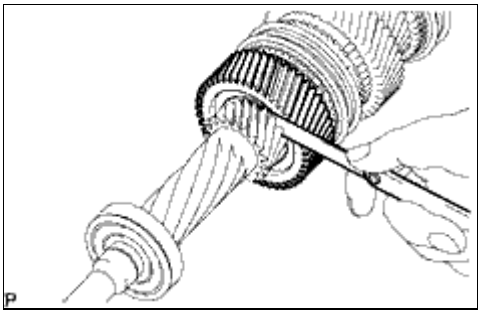
Replace the part or parts determined to be the most likely cause of the problem.

5. INSPECT 5TH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the 5th gear thrust clearance.

Standard clearance:
0.150 to 0.410 mm (0.0059 to 0.0161 in.)

If the clearance is outside the specification, replace the 6th gear sub-assembly, 6th gear needle roller bearing or shaft.



HINT:

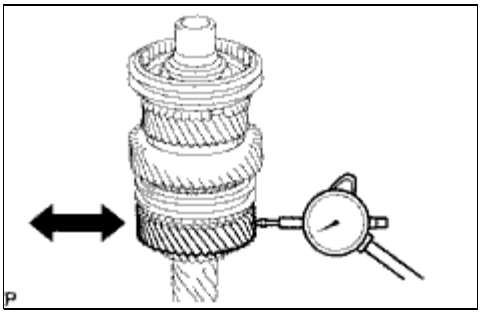
Replace the part or parts determined to be the most likely cause of the problem.

6. INSPECT 5TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 5th gear radial clearance.

Standard clearance:
0.013 to 0.054 mm (0.0006 to 0.0021 in.)

If the clearance is outside the specification, replace the 5th gear, thrust washer, clutch hub or shaft.

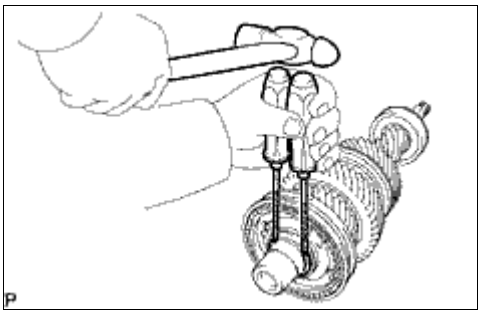


HINT:

Replace the part or parts determined to be the most likely cause of the problem.

7. REMOVE NO. 2 CLUTCH HUB SETTING SHAFT SNAP RING

(a) Using 2 screwdrivers and a hammer, tap off the No. 2 clutch hub setting shaft snap ring.



HINT:

Use a piece of cloth to prevent the snap ring from flying off.

8. REMOVE NO. 2 TRANSMISSION HUB SLEEVE

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(a) Remove the No. 2 transmission hub sleeve from the No. 2 transmission clutch hub.

9. REMOVE NO. 1 SYNCHROMESH SHIFTING KEY

(a) Remove the No. 1 synchromesh shifting key from the No. 2 transmission clutch hub.

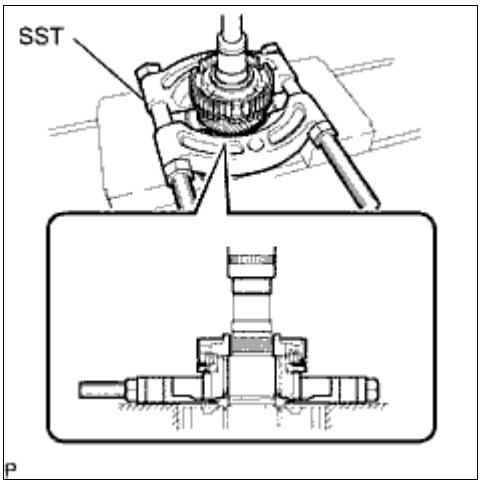
10. REMOVE NO. 2 TRANSMISSION CLUTCH HUB

(a) Using SST and a press, remove the No. 2 transmission clutch hub, No. 3 synchronizer ring set and 3rd gear from the input shaft.

SST: 09555-55010

SST: 09950-60010

09951-00410

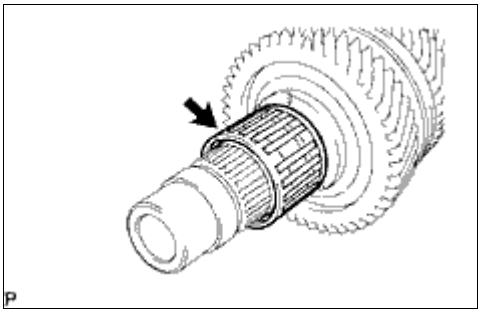


NOTICE:

- Do not tighten SST excessively.
- Support the input shaft by hand so that it does not fall.

11. REMOVE 3RD GEAR NEEDLE ROLLER BEARING

(a) Remove the 3rd gear needle roller bearing from the input shaft.

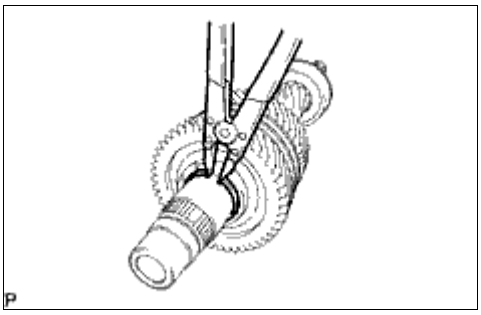


12. REMOVE 3RD GEAR SPACER

(a) Remove the 3rd gear spacer from the input shaft.

13. REMOVE GEAR THRUST WASHER SHAFT SNAP RING

(a) Using a snap ring expander, remove the gear thrust washer shaft snap ring from the input shaft.



14. REMOVE 3RD GEAR THRUST WASHER

(a) Remove the 3rd gear thrust washer from the input shaft.

15. REMOVE GEAR THRUST WASHER STRAIGHT PIN

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(a) Remove the gear thrust washer straight pin from the input shaft.

16. REMOVE 6TH GEAR SUB-ASSEMBLY

(a) Remove the 6th gear sub-assembly from the input shaft.

17. REMOVE NO. 3 SYNCHRONIZER RING

(a) Remove the No. 3 synchronizer ring from the No. 3 transmission clutch hub.

18. REMOVE 6TH GEAR NEEDLE ROLLER BEARING

(a) Remove the 6th gear needle roller bearing from the input shaft.

19. REMOVE 6TH GEAR SPACER

(a) Remove the 6th gear spacer from the input shaft.

20. REMOVE NO. 2 TRANSMISSION HUB SLEEVE

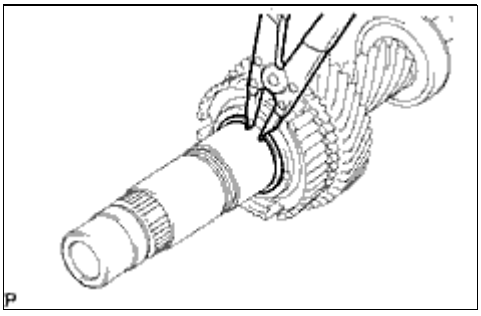
(a) Remove the No. 2 transmission hub sleeve from the No. 3 transmission clutch hub.

21. REMOVE NO. 1 SYNCHROMESH SHIFTING KEY

(a) Remove the No. 1 synchromesh shifting key from the No. 3 transmission clutch hub.

22. REMOVE CLUTCH HUB SET SHAFT SNAP RING

(a) Using a snap ring expander, remove the clutch hub set shaft snap ring from the input shaft.



23. REMOVE 5TH GEAR

(a) Using SST and a press, remove the 5th gear and No. 3 transmission clutch hub from the input shaft.

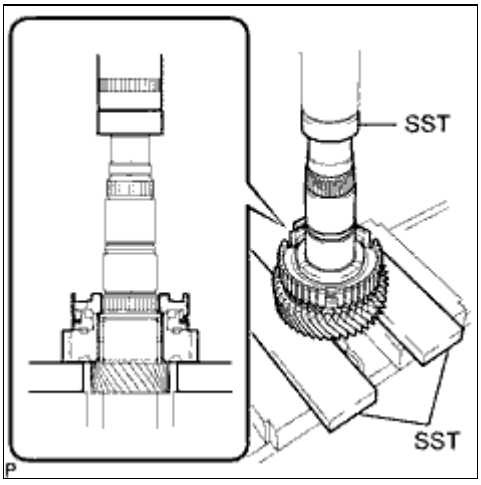
SST: 09527-20011

SST: 09950-60010

09951-00410

NOTICE:

Support the input shaft so that it does not fall.



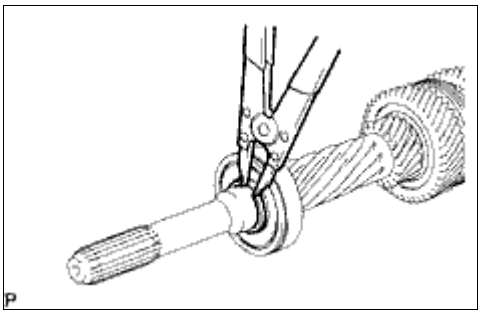
24. REMOVE 5TH GEAR NEEDLE ROLLER BEARING

(a) Remove the 5th gear needle roller bearing from the input shaft.

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25. REMOVE FRONT INPUT SHAFT BEARING

(a) Using a snap ring expander, remove the snap ring from the input shaft.



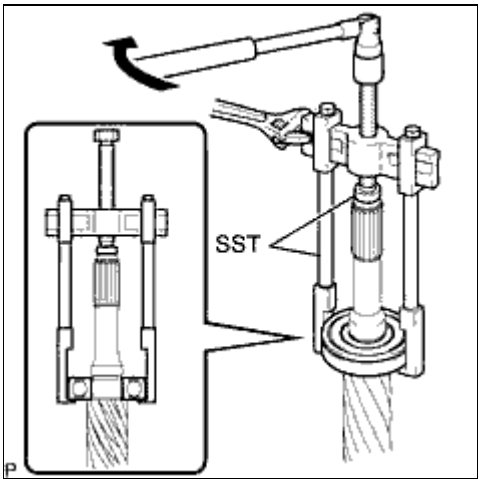
(b) Using SST, remove the front input shaft bearing from the input shaft.

SST: 09950-40011

09951-04010
09952-04010
09953-04020
09954-04020
09955-04031
09957-04010
09958-04011

SST: 09950-60010

09951-00180

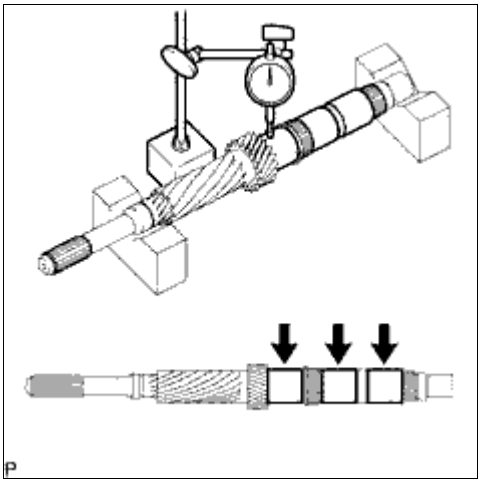


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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM00000177S01CX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: INPUT SHAFT: INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT INPUT SHAFT



(a) Using a dial indicator and 2 V-blocks, measure the shaft runout.

Maximum runout:
0.03 mm (0.0012 in.)

If the runout is more than the maximum, replace the input shaft.

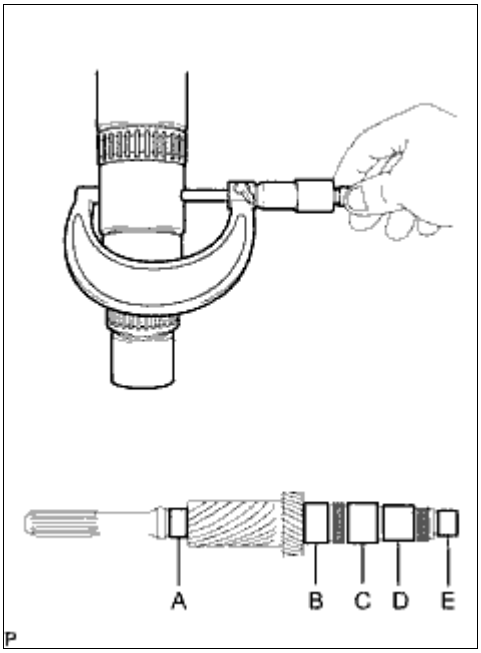
HINT:

Measure the 3 areas shown in the illustration with the input shaft level.

(b) Using a micrometer, measure the journal diameter of each input shaft journal at the specified positions.

Standard Journal Diameter:

ITEM	SPECIFIED CONDITION
Journal A	34.009 to 34.022 mm (1.3390 to 1.3394 in.)
Journal B	44.985 to 45.000 mm (1.7711 to 1.7716 in.)
Journal C	44.985 to 45.000 mm (1.7711 to 1.7716 in.)
Journal D	41.985 to 42.000 mm (1.6530 to 1.6535 in.)
Journal E	32.967 to 32.98 mm (1.2980 to 1.2984 in.)



Minimum Diameter:

ITEM	SPECIFIED CONDITION
Journal A	34.009 mm (1.3389 in.)
Journal B	44.985 mm (1.7711 in.)
Journal C	44.985 mm (1.7711 in.)
Journal D	41.985 mm (1.6530 in.)
Journal E	32.967 mm (1.2980 in.)

If the journal diameter is less than the minimum, replace the input shaft.

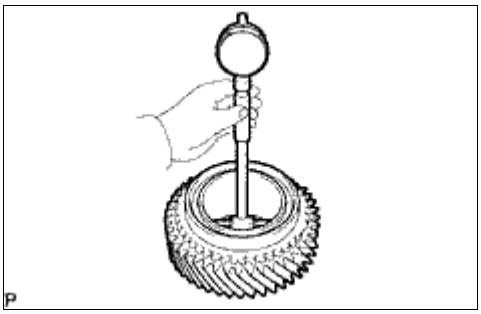
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2. INSPECT 5TH GEAR

(a) Using a cylinder gauge, measure the inside diameter of the 5th gear.

Standard inside diameter:
53.013 to 53.029 mm (2.0872 to 2.0877 in.)
Maximum inside diameter:
53.029 mm (2.0877 in.)

If the inside diameter is more than the maximum, replace the 5th gear.

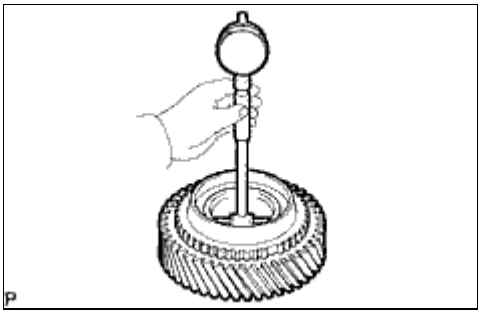


3. INSPECT 6TH GEAR SUB-ASSEMBLY

(a) Using a cylinder gauge, measure the inside diameter of the 6th gear sub-assembly.

Standard inside diameter:
51.015 to 51.040 mm (2.0085 to 2.0094 in.)
Maximum inside diameter:
51.040 mm (2.0094 in.)

If the inside diameter is more than the maximum, replace the 6th gear sub-assembly.

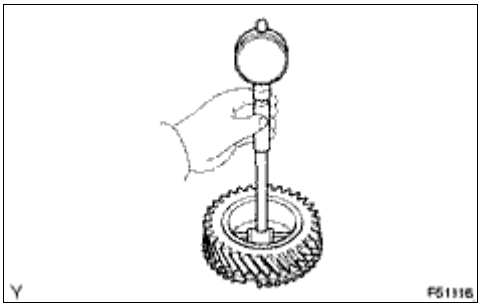


4. INSPECT 3RD GEAR

(a) Using a cylinder gauge, measure the inside diameter of the 3rd gear.

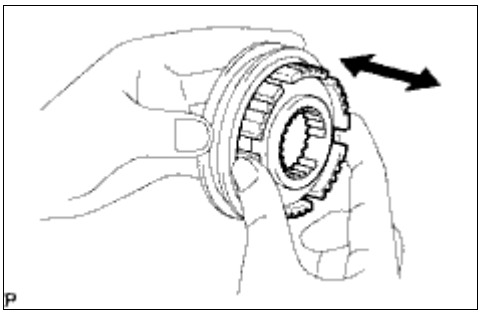
Standard inside diameter:
51.015 to 51.040 mm (2.0085 to 2.0094 in.)
Maximum inside diameter:
51.040 mm (2.0094 in.)

If the inside diameter is more than the maximum, replace the 3rd gear.



5. INSPECT NO. 2 TRANSMISSION HUB SLEEVE

(a) Check the sliding condition between the No. 2 transmission hub and No. 2 transmission hub sleeve.



(b) Check that the splines of the No. 2 transmission hub sleeve are not worn.

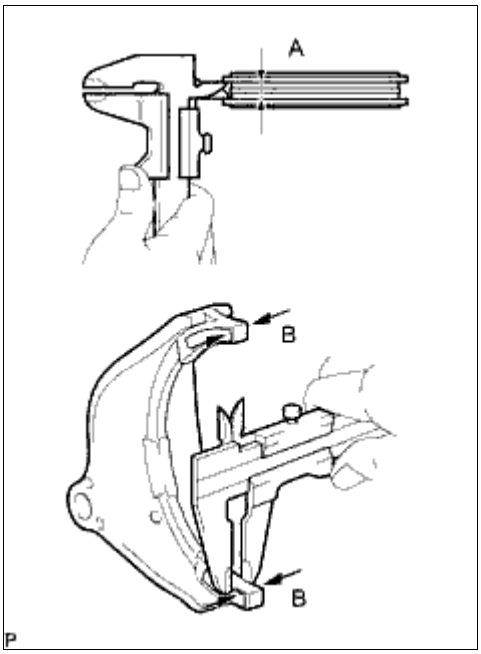
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(c) Using a vernier caliper, measure the width of the No. 2 transmission hub sleeve groove (A) and the thickness of the claw part of the No. 2 or No. 3 gear shift forks (B), and calculate the clearance.

Standard Clearance (A - B):

ITEM	SPECIFIED CONDITION
No. 2 gear shift fork	0.28 to 0.84 mm (0.0111 to 0.0331 in.)
No. 3 gear shift fork	0.28 to 0.84 mm (0.0111 to 0.0331 in.)

If the clearance is outside the specification, replace the No. 2 transmission hub sleeve and gear shift fork.

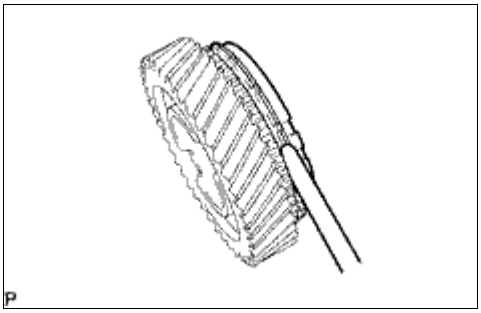


6. INSPECT NO. 3 SYNCHRONIZER RING (for 5th Gear)

(a) Using a feeler gauge, measure the clearance between the No. 3 synchronizer ring and 5th gear.

Standard clearance:
0.77 to 1.63 mm (0.0304 to 0.0641 in.)
Minimum clearance:
0.77 mm (0.0304 in.)

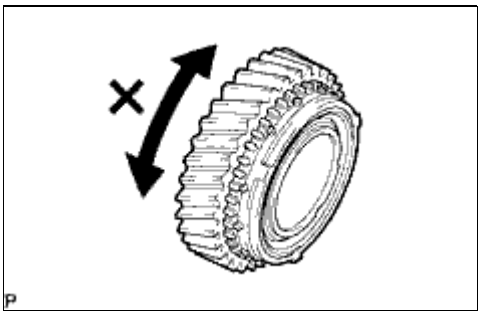
If the clearance is less than the minimum, replace the synchronizer ring.



(b) Coat the 5th gear cone with gear oil.

(c) Check the braking effect of the synchronizer ring.

(1) Turn the synchronizer ring in both directions while pushing it against the 5th gear cone. Check that the ring locks in both directions. If the No. 3 synchronizer ring turns, replace it.



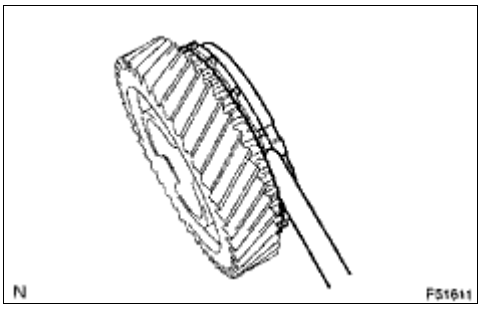
7. INSPECT NO. 3 SYNCHRONIZER RING (for 6th Gear)

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(a) Using a feeler gauge, measure the clearance between the No. 3 synchronizer ring and 6th gear.

Standard clearance:
0.77 to 1.63 mm (0.0304 to 0.0641 in.)
Minimum clearance:
0.77 mm (0.0304 in.)

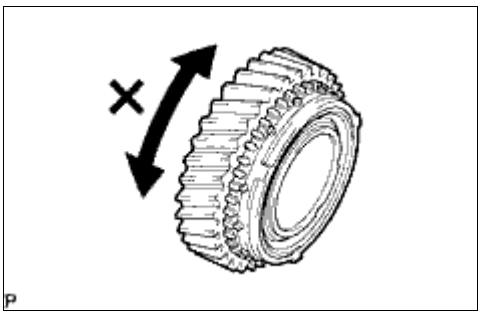
If the clearance is less than the minimum, replace the synchronizer ring.



(b) Coat the 6th gear cone with gear oil.

(c) Check the braking effect of the synchronizer ring.

(1) Turn the synchronizer ring in both directions while pushing it against the 6th gear cone. Check that the ring locks in both directions. If the No. 3 synchronizer ring turns, replace it.

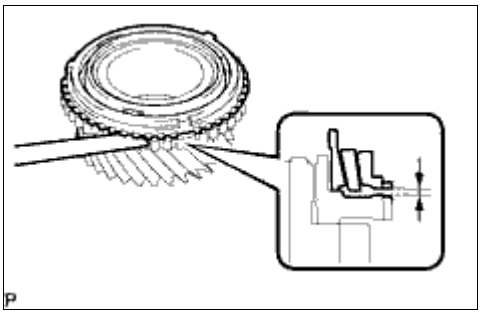


8. INSPECT NO. 3 SYNCHRONIZER RING SET

(a) Using a feeler gauge, measure the clearance between the synchronizer ring and 3rd gear.

Standard clearance:
0.86 to 2.02 mm (0.0339 to 0.0795 in.)
Minimum clearance:
0.86 mm (0.0339 in.)

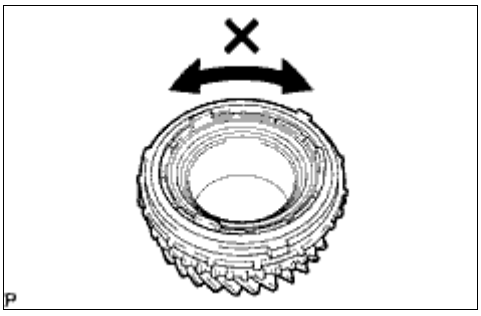
If the clearance is less than the minimum, replace the No. 3 synchronizer ring set.



(b) Coat the 3rd gear cone with gear oil.

(c) Check the braking effect of the synchronizer ring.

(1) Turn the synchronizer ring in both directions while pushing it against the 3rd gear cone. Check that the ring locks in both directions. If the No. 3 synchronizer ring set turns, replace it.



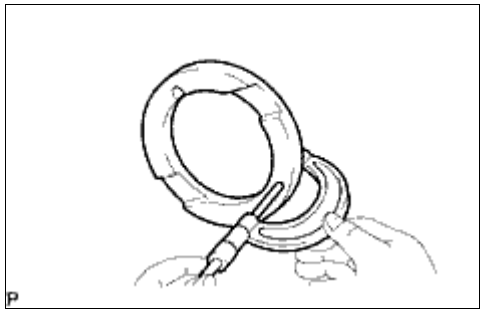
9. INSPECT 3RD GEAR THRUST WASHER

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(a) Using a micrometer, measure the 3rd gear thrust washer thickness.

Standard thickness:
7.62 to 7.68 mm (0.3000 to 0.3023 in.)
Minimum thickness:
7.62 mm (0.3000 in.)

If the thickness is less than the minimum, replace the 3rd gear thrust washer.

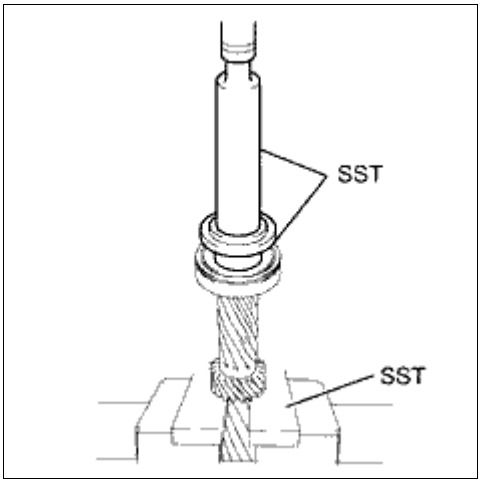


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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177V01CX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: INPUT SHAFT: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

1. INSTALL FRONT INPUT SHAFT BEARING



(a) Using SST and a press, install a new front input shaft bearing to the manual transmission case sub-assembly.

SST: 09316-60011

09316-00011

09316-00061

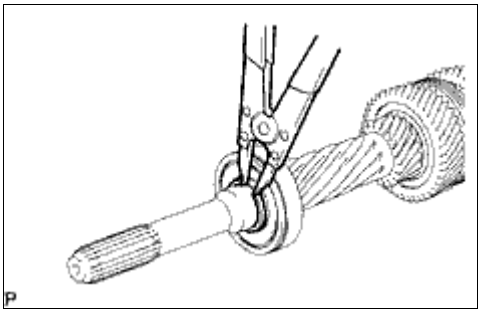
SST: 09527-20011

(b) Select a new snap ring that will allow minimal axial play.

Standard clearance:

0.1 mm (0.00394 in.) or less

Standard Snap Ring:



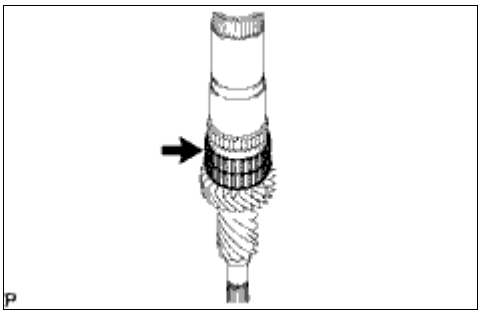
PART NO.	MARK	THICKNESS
90520-T0142	A	2.65 to 2.70 mm (0.1044 to 0.1062 in.)
90520-T0143	B	2.70 to 2.75 mm (0.1063 to 0.1082 in.)
90520-T0144	C	2.75 to 2.80 mm (0.1083 to 0.1102 in.)
90520-T0145	D	2.80 to 2.85 mm (0.1103 to 0.11220 in.)
90520-T0146	E	2.85 to 2.90 mm (0.11221 to 0.1141 in.)
90520-T0147	F	2.90 to 2.95 mm (0.1142 to 0.1161 in.)

(c) Using a snap ring expander, install the snap ring to the input shaft.

2. INSTALL 5TH GEAR NEEDLE ROLLER BEARING

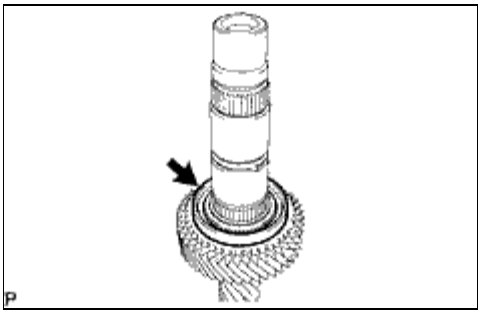
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(a) Coat the 5th gear needle roller bearing with gear oil and install it to the input shaft.



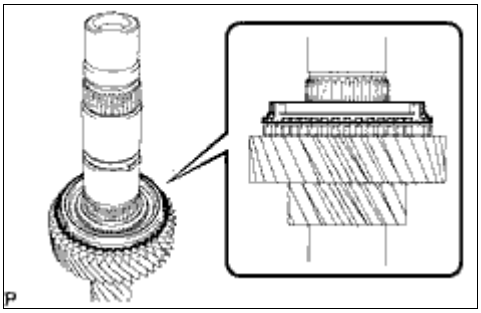
3. INSTALL 5TH GEAR

(a) Coat the 5th gear with gear oil and install it to the input shaft.



4. INSTALL NO. 3 SYNCHRONIZER RING

(a) Coat the No. 3 synchronizer ring with gear oil, and then install it to the input shaft.

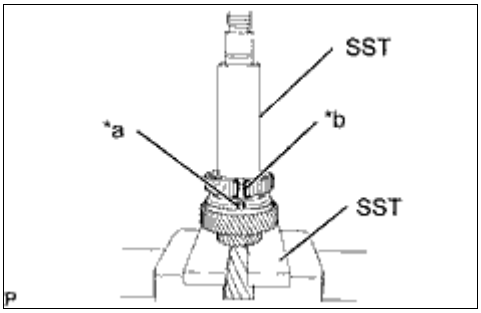


5. INSTALL NO. 3 TRANSMISSION CLUTCH HUB

(a) Using SST and press, install the No. 3 transmission clutch hub to the input shaft.

Text in Illustration

*1	Protrusion of the No. 3 Synchronizer Ring
*2	Groove of the No. 3 Transmission Clutch Hub



SST: 09308-14010
SST: 09527-20011

NOTICE:

Align the protrusion of the No. 3 synchronizer ring with the groove of the No. 3 transmission clutch hub as shown in the illustration

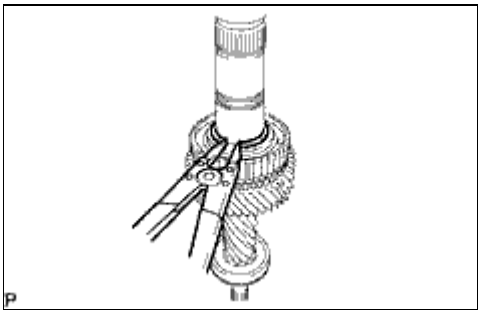
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6. INSTALL CLUTCH HUB SET SHAFT SNAP RING

(a) Select a new clutch hub set shaft snap ring that will allow minimal axial play.

Standard clearance:
0.1 mm (0.00394 in.) or less
Standard Snap Ring:

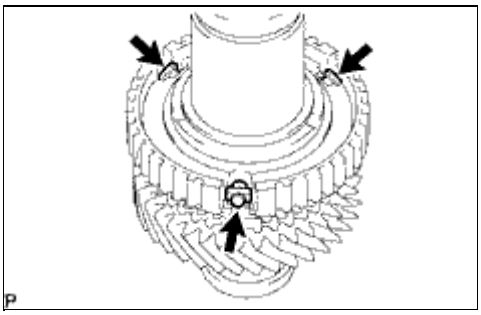
PART NO.	MARK	THICKNESS
90520-T0148	A	1.80 to 1.85 mm (0.0709 to 0.0728 in.)
90520-T0149	B	1.85 to 1.90 mm (0.0729 to 0.07480 in.)
90520-T0150	C	1.90 to 1.95 mm (0.07481 to 0.0767 in.)
90520-T0151	D	1.95 to 2.00 mm (0.0768 to 0.0787 in.)
90520-T0152	E	2.00 to 2.05 mm (0.0788 to 0.08070 in.)
90520-T0153	F	2.05 to 2.10 mm (0.08071 to 0.0826 in.)



(b) Using a snap ring expander, install the clutch hub set shaft snap ring to the input shaft.

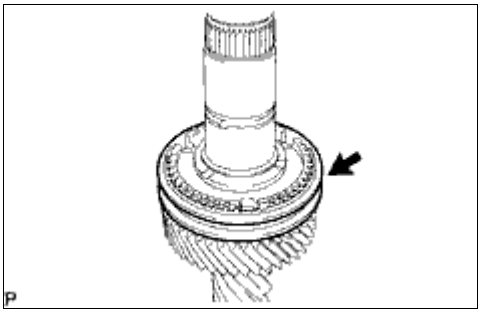
7. INSTALL NO. 1 SYNCHROMESH SHIFTING KEY

(a) Install the 3 No. 1 synchromesh shifting keys to the No. 3 transmission clutch hub.



8. INSTALL NO. 2 TRANSMISSION HUB SLEEVE

(a) Apply a light coat of gear oil to the sleeve and hub.

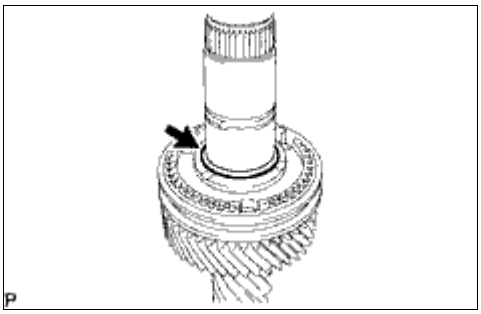


(b) Install the No. 2 transmission hub sleeve to the No. 3 transmission clutch hub.

9. INSTALL 6TH GEAR SPACER

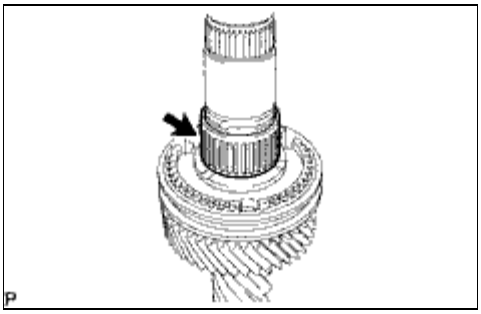
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(a) Coat the 6th gear spacer with gear oil, and then install it to the input shaft.



10. INSTALL 6TH GEAR NEEDLE ROLLER BEARING

(a) Coat the 6th gear needle roller bearing with gear oil, and then install it to the input shaft.

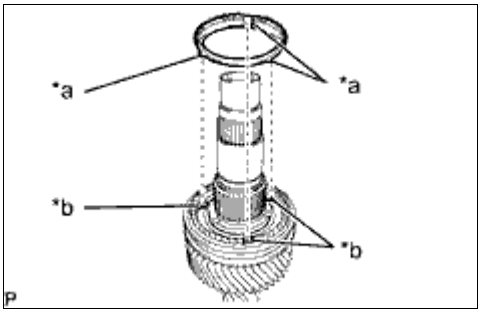


11. INSTALL NO. 3 SYNCHRONIZER RING

(a) Coat the No. 3 synchronizer ring with gear oil, and then install it to the No. 3 transmission clutch hub.

Text in Illustration

*a	Protrusion
*b	Groove



NOTICE:

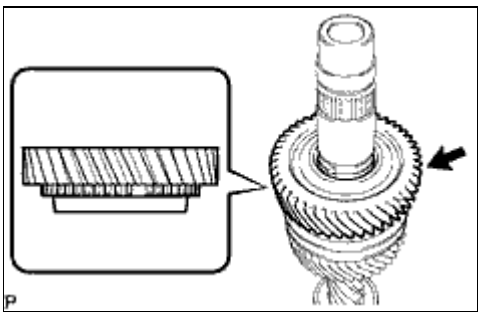
Align the protrusion of the No. 3 synchronizer ring with the groove of the No. 3 transmission clutch hub.

12. INSTALL 6TH GEAR SUB-ASSEMBLY

(a) Coat the 6th gear sub-assembly with gear oil, and then install it to the input shaft.

HINT:

Make sure that the 6th gear sub-assembly faces the correct direction as shown in the illustration.

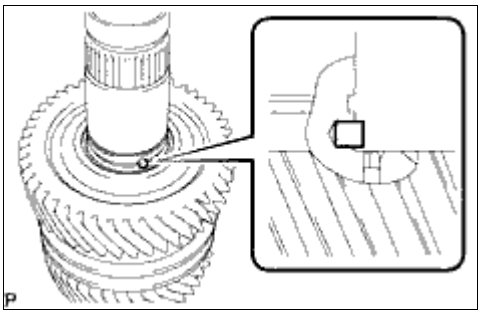


(b) Check that the 6th gear sub-assembly and No. 3 synchronizer ring move smoothly.

13. INSTALL GEAR THRUST WASHER STRAIGHT PIN

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(a) Install the gear thrust washer straight pin to the input shaft.

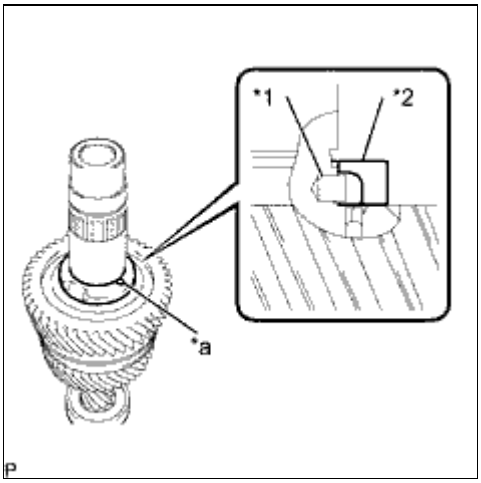


14. INSTALL 3RD GEAR THRUST WASHER

(a) Coat the 3rd gear thrust washer with gear oil and install it to the input shaft.

Text in Illustration

*1	Gear Thrust Washer Straight Pin
*2	3rd Gear Thrust Washer
*a	Groove



HINT:

Align the groove of the 3rd gear thrust washer with the gear thrust washer straight pin.

15. INSTALL GEAR THRUST WASHER SHAFT SNAP RING

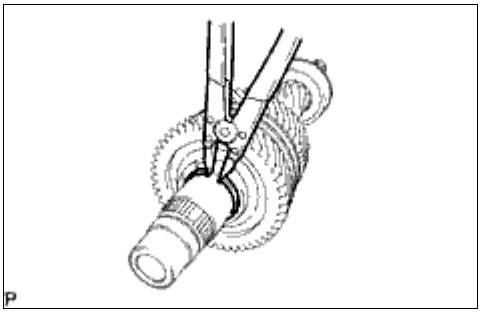
(a) Select a new gear thrust washer shaft snap ring that will allow minimal axial play.

Standard clearance:

0.1 mm (0.00394 in.) or less

Standard Snap Ring:

PART NO.	MARK	THICKNESS
90520-T0155	A	2.07 to 2.12 mm (0.0815 to 0.0834 in.)
90520-T0156	B	2.12 to 2.17 mm (0.0835 to 0.0854 in.)
90520-T0157	C	2.17 to 2.22 mm (0.0855 to 0.08740 in.)
90520-T0158	D	2.22 to 2.27 mm (0.08741 to 0.0893 in.)
90520-T0159	E	2.27 to 2.32 mm (0.0894 to 0.0913 in.)
90520-T0160	F	2.32 to 2.37 mm (0.0914 to 0.0933 in.)

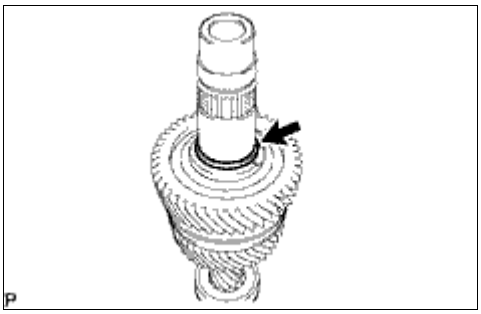


(b) Using a snap ring expander, install the gear thrust washer shaft snap ring to the input shaft.

16. INSTALL 3RD GEAR SPACER

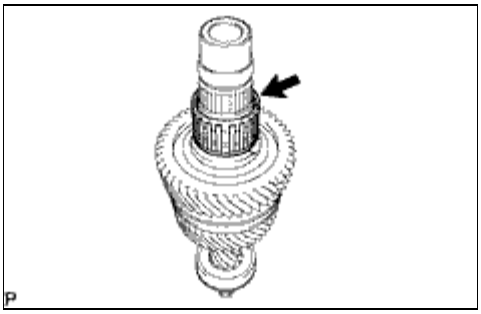
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(a) Coat the 3rd gear spacer with gear oil and install it to the input shaft.



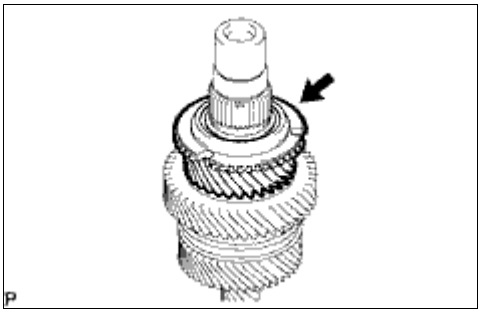
17. INSTALL 3RD GEAR NEEDLE ROLLER BEARING

(a) Coat the 3rd gear needle roller bearing with gear oil, and then install it to the input shaft.



18. INSTALL 3RD GEAR

(a) Coat the 3rd gear with gear oil, and then install it to the input shaft.

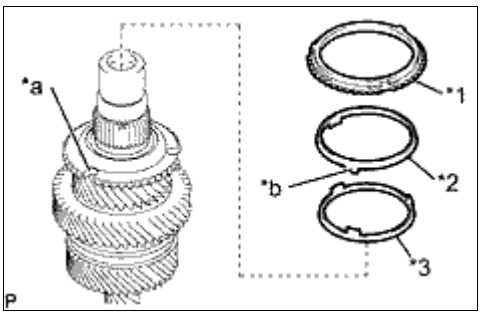


19. INSTALL NO. 3 SYNCHRONIZER RING SET

(a) Coat the No. 3 synchronizer ring set with gear oil, and then install it to the input shaft.

Text in Illustration

*1	No. 3 Synchronizer Ring (Outer Ring)
*2	No. 3 Synchronizer Ring (Middle Ring)
*3	No. 3 Synchronizer Ring (Inner Ring)
*a	Groove
*b	Protrusion



NOTICE:

Align the protrusion of the No. 3 synchronizer ring set with the groove of the 3rd gear.

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20. INSTALL NO. 2 TRANSMISSION CLUTCH HUB

(a) Using SST, set the input shaft

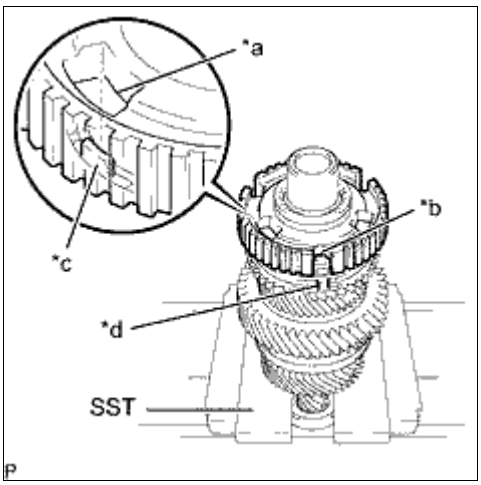
SST: 09527-20011

(b) Using SST and a press, install the No. 2 transmission clutch hub to the input shaft.

(c) Install the No. 2 transmission clutch hub to the input shaft.

Text in Illustration

*a	Hole of the No. 2 transmission Clutch Hub
*b	Groove of the No. 2 transmission Clutch Hub
*c	Protrusion of the No. 3 Synchronizer Ring (Inner ring)
*d	Protrusion of the No. 3 Synchronizer Ring (Outer ring)

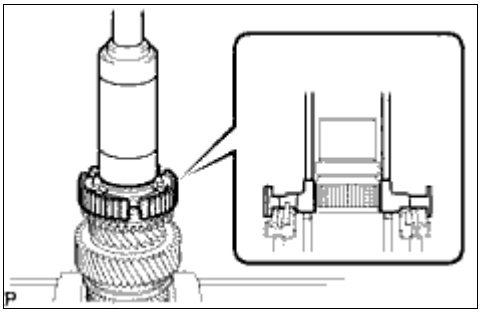


HINT:

- Align the protrusion of the No. 3 synchronizer ring set (Inner ring) with the hole of the No. 2 transmission clutch hub as shown in the illustration
- Align the protrusion of the No. 2 synchronizer ring set with the groove of the No. 2 transmission clutch hub as shown in the illustration

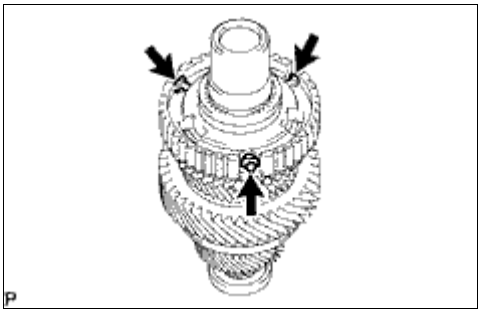
(d) Using SST and a press, install the No. 3 transmission clutch hub to the input shaft.

SST: 09309-37010
SST: 09527-20011



21. INSTALL NO. 1 SYNCHROMESH SHIFTING KEY

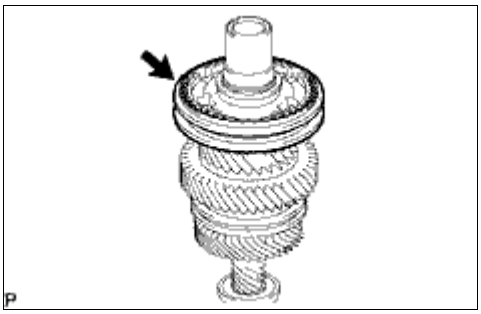
(a) Install the 3 No. 1 synchromesh shifting keys to the No. 2 transmission clutch hub.



22. INSTALL NO. 2 TRANSMISSION HUB SLEEVE

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(a) Apply a light coat of gear oil to the sleeve and hub.

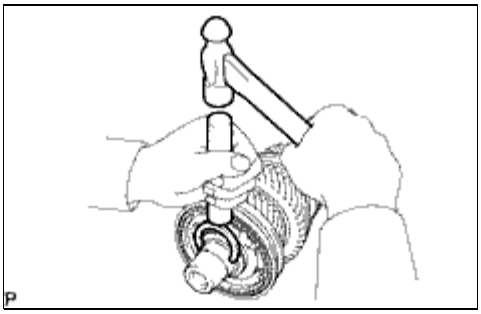


(b) Install the No. 2 transmission hub sleeve to the No. 2 transmission clutch hub.

23. INSTALL NO. 2 CLUTCH HUB SETTING SHAFT SNAP RING

(a) Select a new No. 2 clutch hub setting shaft snap ring that will allow minimal axial play.

Standard clearance:
0.1 mm (0.00394 in.) or less
Standard Snap Ring:



PART NO.	MARK	THICKNESS
90520-T0161	A	2.50 to 2.55 mm (0.0984 to 0.1003 in.)
90520-T0162	B	2.55 to 2.60 mm (0.1004 to 0.1023 in.)
90520-T0163	C	2.60 to 2.65 mm (0.1024 to 0.1043 in.)
90520-T0164	D	2.65 to 2.70 mm (0.1044 to 0.1062 in.)
90520-T0165	E	2.70 to 2.75 mm (0.1063 to 0.1082 in.)
90520-T0166	F	2.75 to 2.80 mm (0.1083 to 0.1102 in.)

(b) Using a brass bar and hammer, install the No. 2 clutch hub setting shaft snap ring to the input shaft.

24. INSPECT 3RD GEAR THRUST CLEARANCE INFO

25. INSPECT 3RD GEAR RADIAL CLEARANCE INFO

26. INSPECT 6TH GEAR SUB-ASSEMBLY THRUST CLEARANCE INFO

27. INSPECT 6TH GEAR SUB-ASSEMBLY RADIAL CLEARANCE INFO

28. INSPECT 5TH GEAR THRUST CLEARANCE INFO

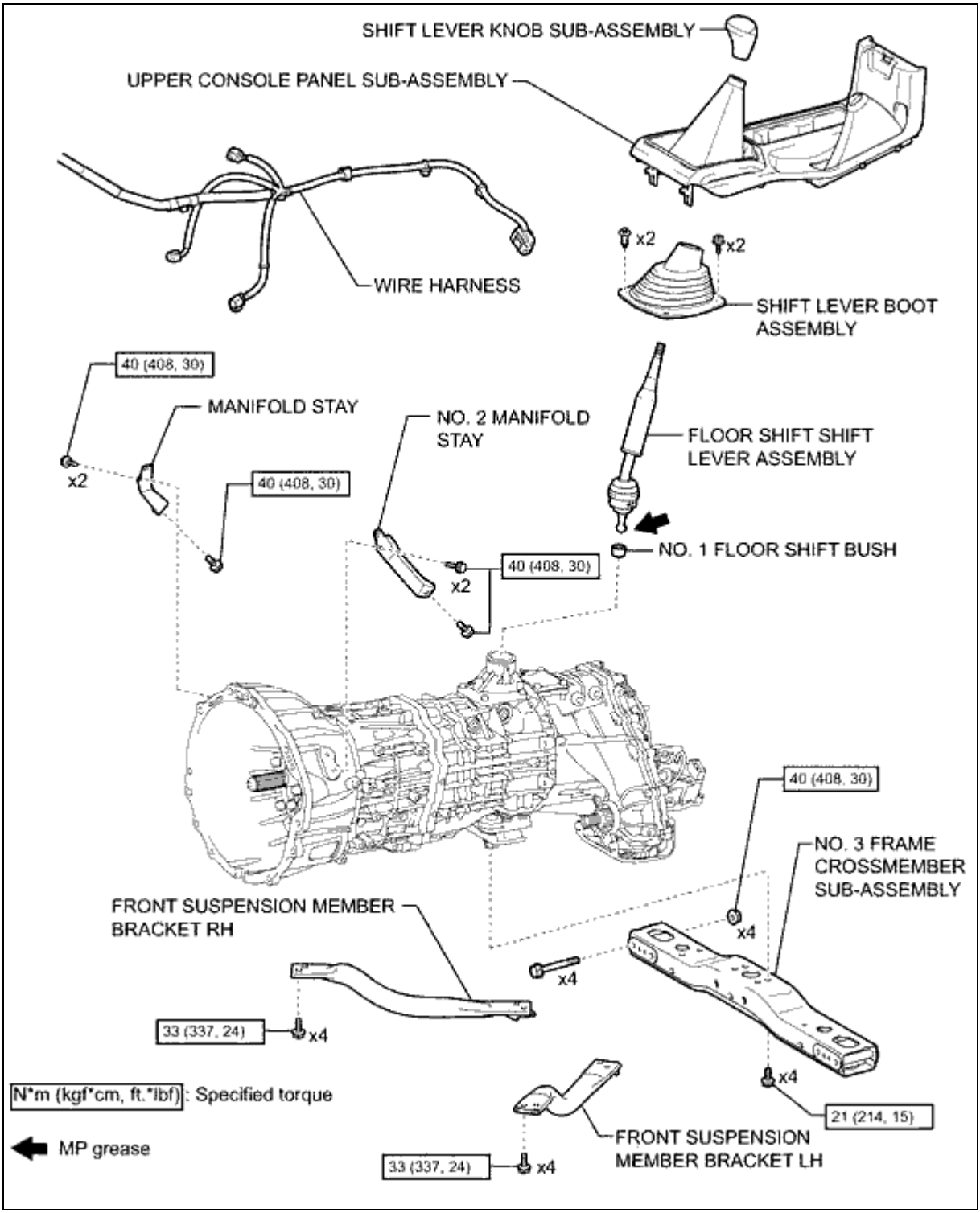
29. INSPECT 5TH GEAR RADIAL CLEARANCE INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM00000178R00PX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION ASSEMBLY: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

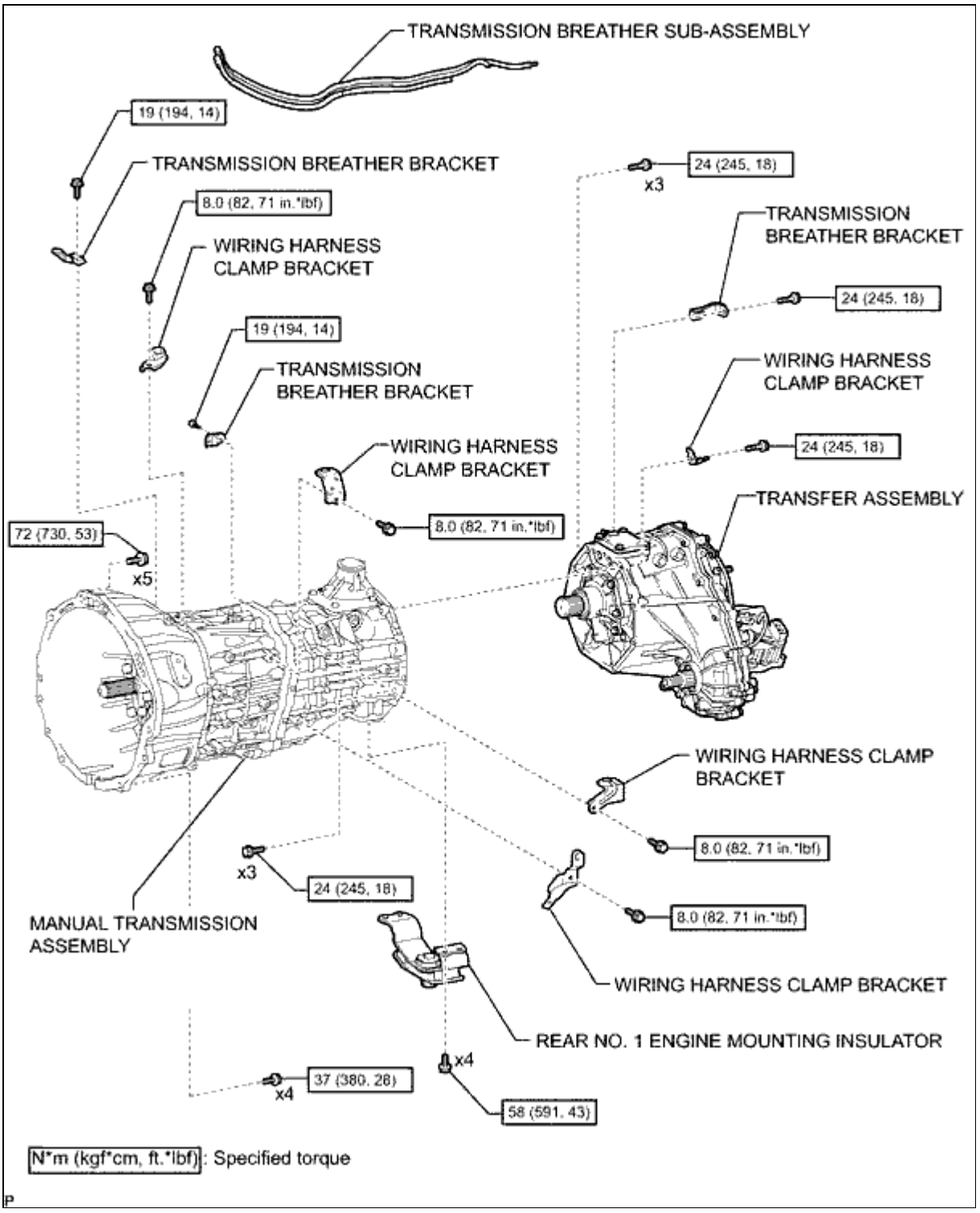
COMPONENTS

ILLUSTRATION



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ILLUSTRATION



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000178Q016X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION ASSEMBLY: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL TRANSFER ASSEMBLY

INFO

2. INSTALL WIRING HARNESS CLAMP BRACKET

(a) Install the 4 wiring harness clamp brackets with the 4 bolts.

Torque:

8.0 N·m {82 kgf·cm, 71in·lbf}

3. INSTALL TRANSMISSION BREATHER SUB-ASSEMBLY

(a) Install the 2 brackets to the manual transmission assembly with the 2 bolts.

Torque:

19 N·m {194 kgf·cm, 14ft·lbf}

(b) Install the transmission breather sub-assembly to the control shift lever retainer assembly.

(c) Attach the 3 breather hose clamps.

4. INSTALL MANUAL TRANSMISSION ASSEMBLY

(a) Install the manual transmission assembly with the 9 bolts.

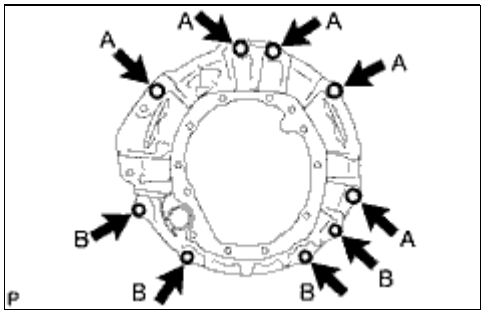
Torque:

Bolt A -

72 N·m {730 kgf·cm, 53ft·lbf}

Bolt B -

37 N·m {380 kgf·cm, 28ft·lbf}



5. CONNECT WIRE HARNESS

(a) Attach the 10 clamps to install the wire harness.

(b) Connect the 2 connectors.

6. INSTALL REAR NO. 1 ENGINE MOUNTING INSULATOR

(a) Install the rear engine mounting insulator to the manual transmission assembly with the 4 bolts.

Torque:

58 N·m {591 kgf·cm, 43ft·lbf}

7. INSTALL NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

(a) Install the No. 3 frame crossmember sub-assembly with the 4 nuts and 4 bolts.

Torque:

40 N·m {408 kgf·cm, 30ft·lbf}

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(b) Install the 4 bolts to the No. 3 frame crossmember sub-assembly.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

8. INSTALL FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Install the front suspension member bracket LH and front suspension member bracket RH to the No. 3 frame crossmember sub-assembly and vehicle body with the 8 bolts.

Torque:

33 N·m {337 kgf·cm, 24ft·lbf}

9. INSTALL FRONT DIFFERENTIAL CARRIER ASSEMBLY

INFO

10. INSTALL PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

11. INSTALL STARTER ASSEMBLY

INFO

12. INSTALL NO. 2 MANIFOLD STAY INFO

13. INSTALL MANIFOLD STAY INFO

14. INSTALL FRONT EXHAUST PIPE ASSEMBLY INFO

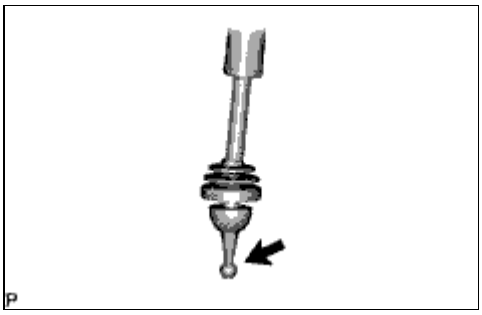
15. ADD MANUAL TRANSMISSION OIL INFO

16. INSTALL NO. 1 FLOOR SHIFT BUSH

(a) Install the No. 1 floor shift bush to the floor shift shift lever assembly.

17. INSTALL FLOOR SHIFT SHIFT LEVER ASSEMBLY

(a) Apply MP grease to the tip of the floor shift shift lever assembly.



Text in Illustration

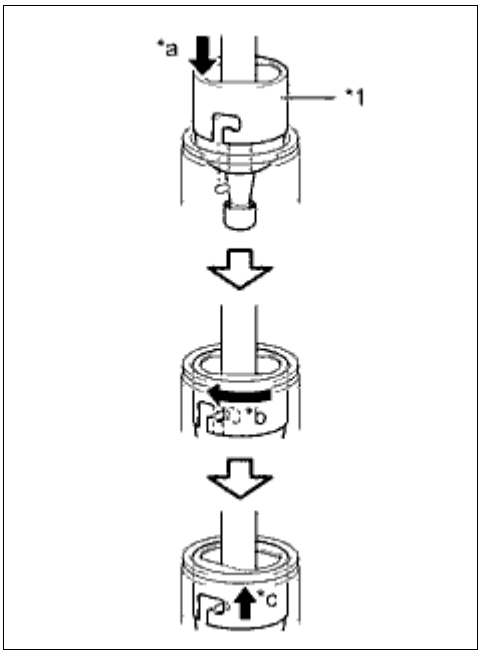
➡	MP grease

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(b) Cover the shift lever cap with a cloth.

Text in Illustration

*1	Shift Lever Cap
*a	Press Down
*b	Clockwise
*c	Lock



(c) While pressing down on the shift lever cap, turn it clockwise to install the shift lever assembly.

(d) Attach the shift lever cap boot to the manual transmission.

18. INSTALL SHIFT LEVER BOOT ASSEMBLY

(a) Install the shift lever boot assembly with the 2 screws and 2 clips.

19. INSTALL FRONT CONSOLE BOX

INFO

20. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000178S016X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION ASSEMBLY: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work.

INFO

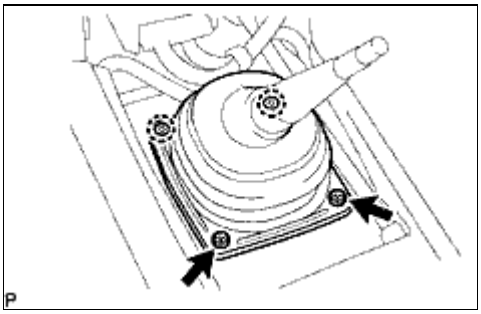
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

3. REMOVE FRONT CONSOLE BOX

INFO

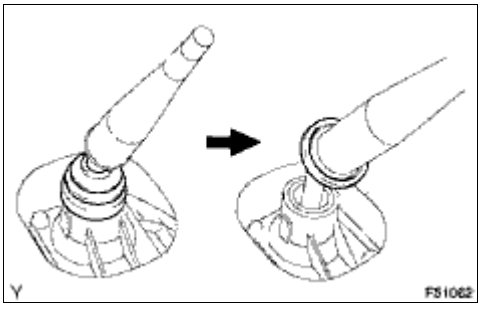
4. REMOVE SHIFT LEVER BOOT ASSEMBLY

(a) Remove the 2 screws, 2 clips and shift lever boot assembly.



5. REMOVE FLOOR SHIFT SHIFT LEVER ASSEMBLY

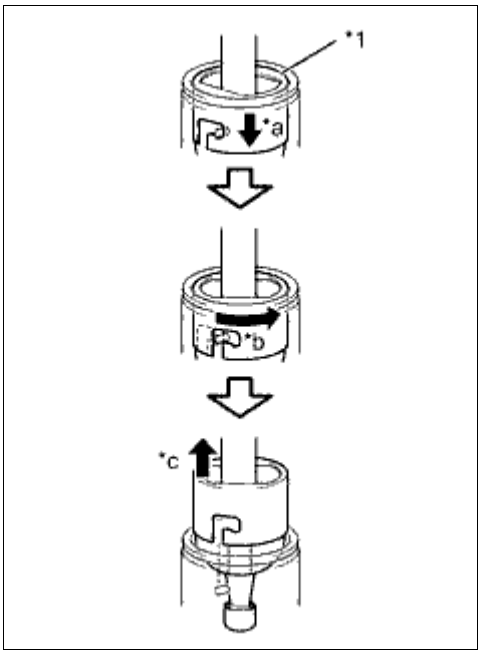
(a) Detach the shift lever cap boot from the manual transmission.



(b) Cover the shift lever cap with a cloth.

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(c) While pressing down on the shift lever cap, turn it counterclockwise, and then pull to remove the shift lever.

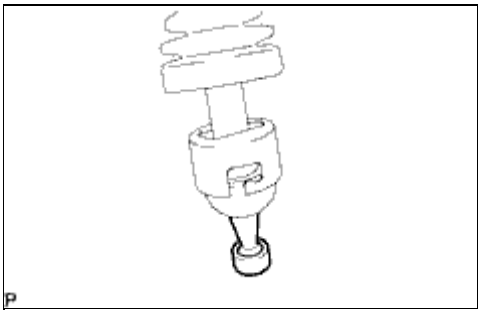


Text in Illustration

*1	Shift Lever Cap
*a	Press Down
*b	Counterclockwise
*c	Pull Out

6. REMOVE NO. 1 FLOOR SHIFT BUSH

(a) Remove the No. 1 floor shift bush from the floor shift shift lever assembly.



7. DRAIN MANUAL TRANSMISSION OIL INFO

8. REMOVE FRONT EXHAUST PIPE ASSEMBLY INFO

9. REMOVE MANIFOLD STAY INFO

10. REMOVE NO. 2 MANIFOLD STAY INFO

11. REMOVE STARTER ASSEMBLY

INFO

12. REMOVE PROPELLER SHAFT WITH CENTER BEARING ASSEMBLY

INFO

13. REMOVE FRONT DIFFERENTIAL CARRIER ASSEMBLY

INFO

14. SUPPORT MANUAL TRANSMISSION ASSEMBLY

(a) Support the manual transmission with a transmission jack.

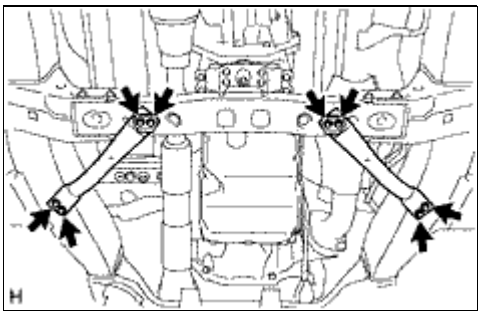
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NOTICE:

- Make sure the high transmission jack attachment is centered on the safety stand.
- Secure the part with a rope, attachment, etc.

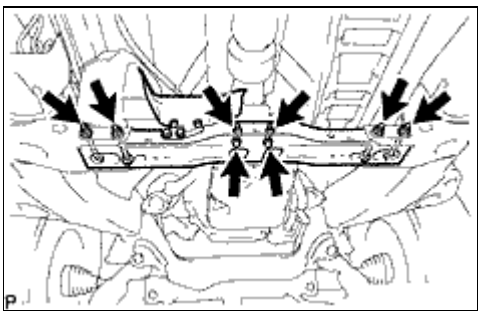
15. REMOVE FRONT SUSPENSION MEMBER BRACKET LH AND RH

(a) Remove the 8 bolts, front suspension member bracket LH and front suspension member bracket RH from the No. 3 frame crossmember sub-assembly and vehicle body.



16. REMOVE NO. 3 FRAME CROSSMEMBER SUB-ASSEMBLY

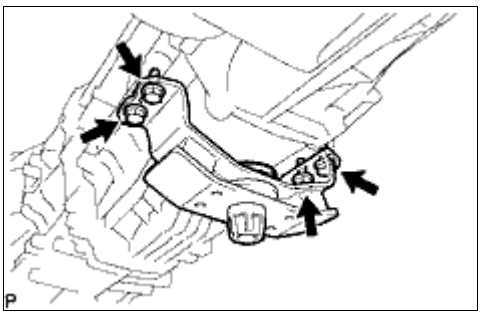
(a) Remove the 4 bolts on the No. 3 frame crossmember sub-assembly.



(b) Remove the 4 nuts, 4 bolts and No. 3 frame crossmember sub-assembly.

17. REMOVE REAR NO. 1 ENGINE MOUNTING INSULATOR

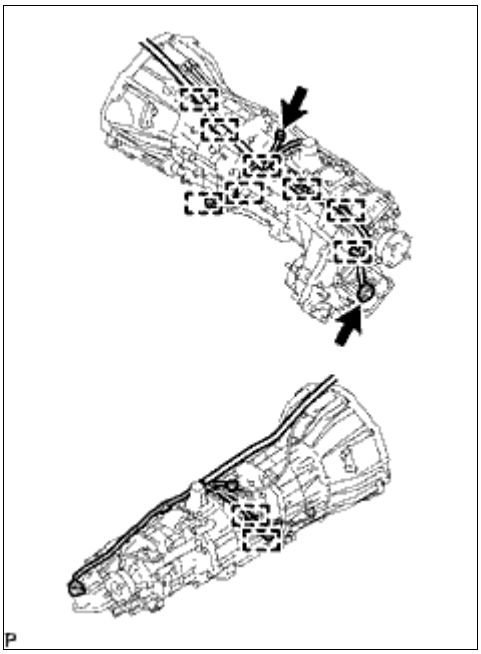
(a) Remove the 4 bolts and rear No. 1 engine mounting insulator from the manual transmission assembly.



18. DISCONNECT WIRE HARNESS

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(a) Disconnect the 2 connectors and wire harness.



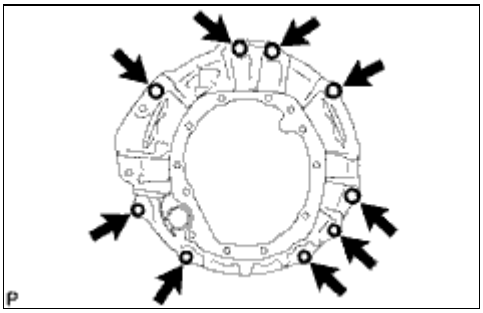
(b) Detach the 10 clamps to separate the wire harness.

19. REMOVE MANUAL TRANSMISSION ASSEMBLY

(a) Remove the 9 bolts and manual transmission assembly.

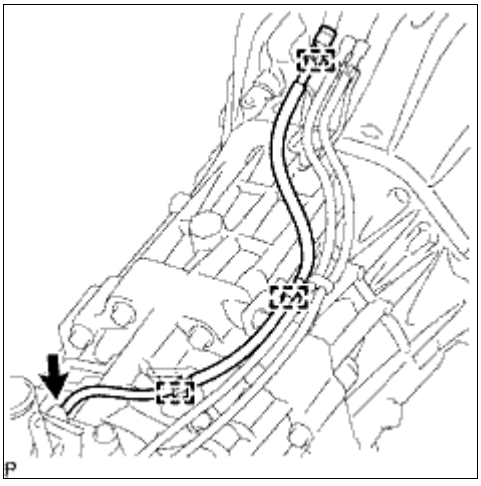
NOTICE:

As the manual transmission assembly is very heavy, be sure to support it securely.



20. REMOVE TRANSMISSION BREATHER SUB-ASSEMBLY

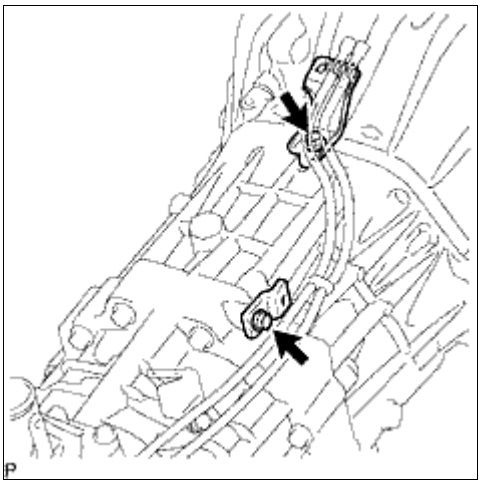
(a) Detach the 3 breather hose clamps.



(b) Remove the transmission breather sub-assembly from the control shift lever retainer assembly.

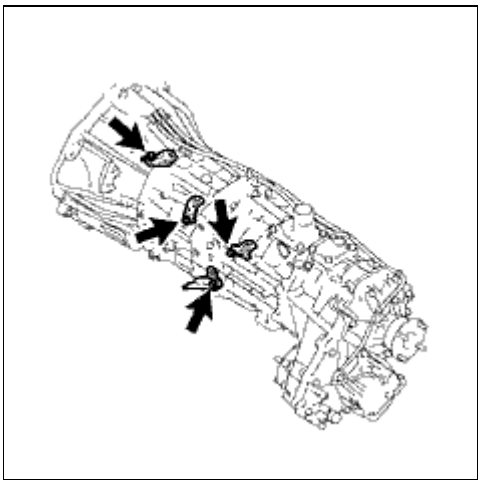
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(c) Remove the 2 bolts and 2 brackets.



21. REMOVE WIRING HARNESS CLAMP BRACKET

(a) Remove the 4 bolts and 4 wiring harness clamp brackets.



22. REMOVE TRANSFER ASSEMBLY

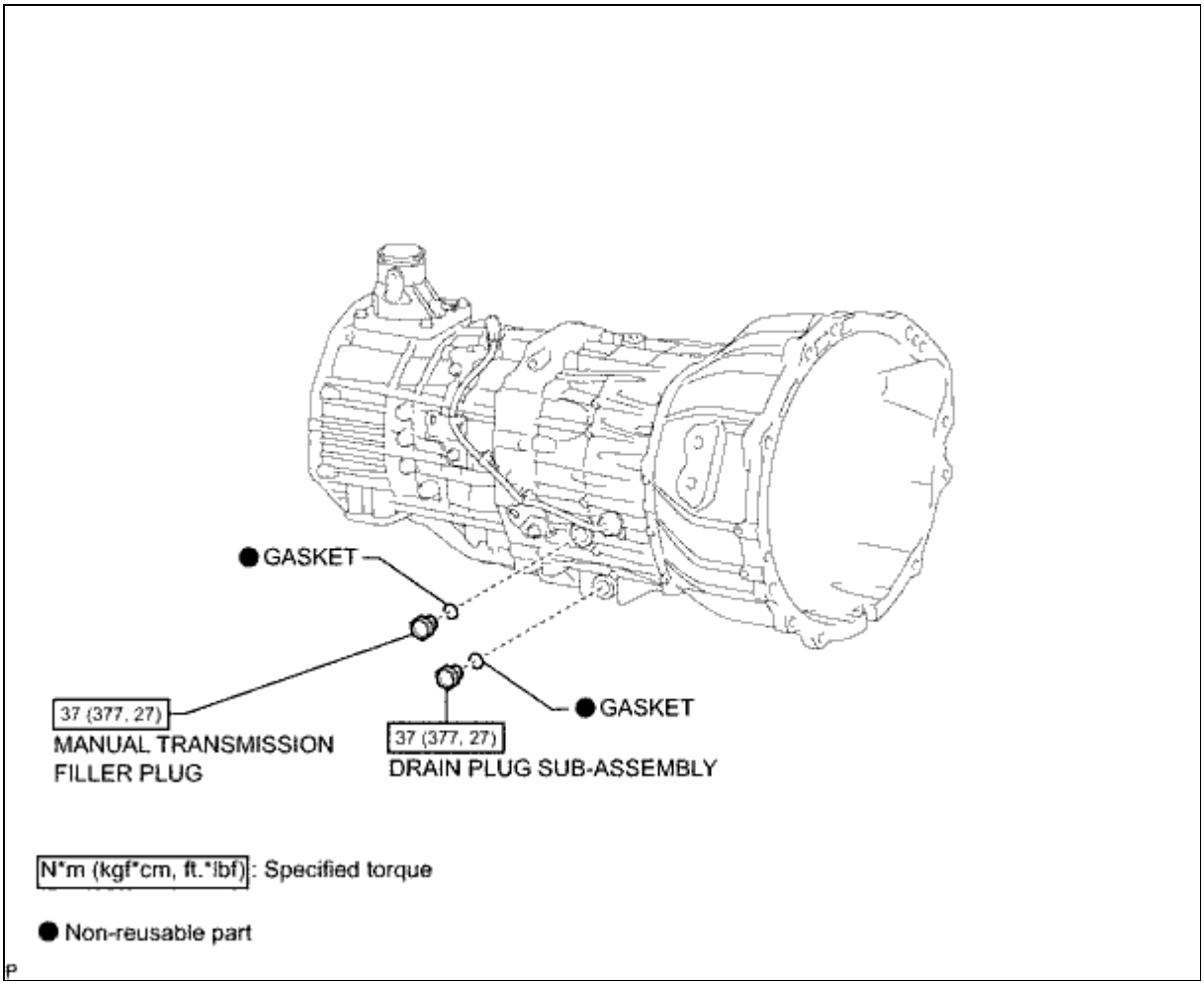
INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM000005V00000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION OIL: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM00000178P00KX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION OIL: ON-VEHICLE INSPECTION; 2016 MY Tacoma [08/2015 -]		

ON-VEHICLE INSPECTION

1. INSPECT MANUAL TRANSMISSION OIL

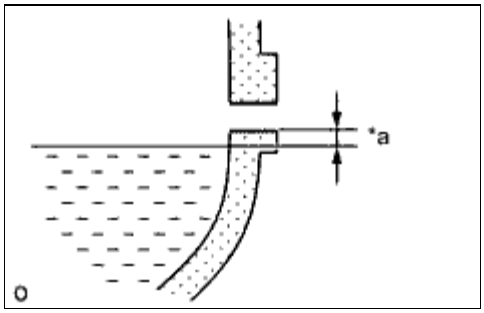
(a) Park the vehicle on a level surface.

(b) Remove the transmission filler plug and gasket.

(c) Check that the oil level is between 0 to 5 mm (0 to 0.196 in.) from the bottom lip of the filler plug opening.

Text in Illustration

*a	0 to 5.0 mm (0 to 0.196 in.)



If the result is not as specified, add transmission oil.

Manual transmission oil:

OIL GRADE	OIL VISCOSITY	STANDARD CAPACITY
Gear oil API GL-3 (GL-4)	SAE 75W-90	2.5 liters (2.6 US qts, 2.2 Imp. qts)

NOTICE:

- Too much or too little oil will lead to transmission problems.
- After adjusting the oil level, drive the vehicle and check the oil level again.

(d) Inspect for oil leaks when the oil level is low.

(e) Install a new gasket and the transmission filler plug.

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000005UZZ000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION OIL: REPLACEMENT; 2016 MY Tacoma [08/2015 -]		

REPLACEMENT

1. DRAIN MANUAL TRANSMISSION OIL

(a) Remove the manual transmission filler plug and gasket.

(b) Remove the drain plug sub-assembly and gasket and then drain the manual transmission oil.

(c) Install a new gasket and the drain plug sub-assembly.

Torque:

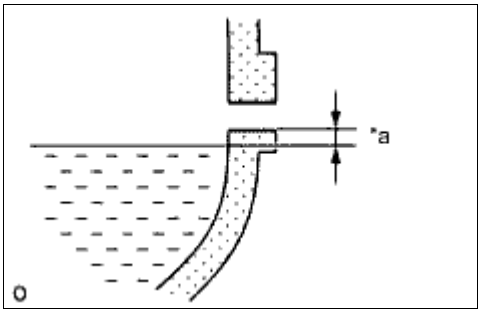
37 N·m {377 kgf·cm, 27ft·lbf}

2. ADD MANUAL TRANSMISSION OIL

(a) Add manual transmission oil until the oil level is within 0 to 5 mm (0 to 0.196 in.) from the bottom lip of the manual transmission filler plug opening.

Text in Illustration

*a	0 to 5.0 mm (0 to 0.196 in.)



Manual transmission oil:

OIL GRADE	OIL VISCOSITY	STANDARD CAPACITY
Gear oil API GL-3 (GL-4)	SAE 75W-90	2.5 liters (2.6 US qts, 2.2 Imp. qts)

3. INSPECT MANUAL TRANSMISSION OIL INFO

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000005VWJ000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: CHECK FOR INTERMITTENT PROBLEMS; 2016 MY Tacoma [08/2015 -]		

CHECK FOR INTERMITTENT PROBLEMS

HINT:

Inspect the vehicle ECM using check mode. Intermittent problems are easier to detect with the Techstream when the ECM is in check mode. In check mode, the ECM uses 1 trip detection logic, which is more sensitive to malfunctions than normal mode (default), which uses 2 trip detection logic.

1. Clear DTCs INFO .
2. Switch the ECM from normal mode to check mode using the Techstream INFO .
3. Perform a simulation test INFO .
4. Check and wiggle the harness(es), connector(s) and terminal(s) INFO .

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000005VWO000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: CHECK MODE PROCEDURE; 2016 MY Tacoma [08/2015 -]		

CHECK MODE PROCEDURE

1. DESCRIPTION

Check mode has a higher sensitivity to malfunctions and can detect malfunctions that cannot be detected in normal mode. Check mode can also detect all of the malfunctions that can be detected in normal mode. In check mode, DTCs are stored with 1 trip detection logic.

NOTICE:

- All DTCs and freeze frame data will be cleared if: 1) the Techstream is used to change the ECM from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or off.
- Before changing to check mode, make a note of the DTCs and freeze frame data.

2. CHECK MODE PROCEDURE

(a) Make sure that the following conditions are met:

(1) Battery voltage is 11 V or higher.

(2) The throttle valve is fully closed.

(3) The shift lever is in neutral.

(4) The A/C switch is off.

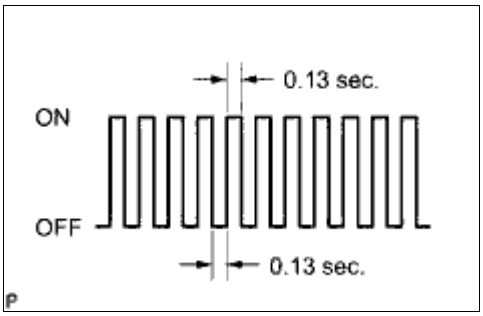
(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn the Techstream on.

(e) Enter the following menus: Powertrain / Transmission / Utility / Check Mode.

(f) Check that the MIL flashes as shown in the illustration.



(g) Start the engine. The MIL should turn off after the engine starts.

(h) Simulate the conditions of the malfunction described by the customer.

(i) Using the Techstream, check for DTCs and freeze frame data.

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000005VWP000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: DATA LIST / ACTIVE TEST; 2016 MY Tacoma [08/2015 -]		

DATA LIST / ACTIVE TEST

1. DATA LIST

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

(a) Warm up the engine.

(b) Turn the ignition switch off.

(c) Connect the Techstream to the DLC3.

(d) Turn the ignition switch to ON.

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Transmission / Data List.

(g) According to the display on the Techstream, read the Data List.

Transmission

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Total Distance Traveled	Total distance traveled/ Min.: 0 km (0 mile) Max.: 16777215 km (10425361 mile)	-	-

(h) Enter the following menus: Powertrain / Engine / Data List.

(i) According to the display on the Techstream, read the Data List.

Engine

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed/ Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	• This is the current vehicle speed. • The vehicle speed is detected using the wheel speed sensors. ○ There is a delay in when the vehicle speed data is displayed. Therefore, even if the vehicle speed listed in the freeze frame data is 0 km/h (0 mph), this does not always mean that the

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TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
			malfunction occurred when the vehicle was stopped.
Engine Speed	Engine speed/ Min.: 0 rpm Max.: 16383 rpm	500 to 600 rpm: Idling (shift lever in neutral, engine warmed up and A/C off)	When the crankshaft position sensor is malfunctioning, "Engine Speed" is approximately 0 rpm or varies greatly from the actual engine speed.
Battery Voltage	Battery voltage/ Min.: 0 V Max.: 65.5 V	11 to 14 V: Idling	If 11 V or less, characteristics of some electrical components may change.
BATT Voltage	Battery voltage/ Min.: 0 V Max.: 79.998 V	11 to 14 V: Idling	If 11 V or less, characteristics of some electrical components may change.





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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000005VWM000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: DIAGNOSIS SYSTEM; 2016 MY Tacoma [08/2015 -]		

DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) To check DTCs, connect the Techstream to the Data Link Connector 3 (DLC3) of the vehicle. The Techstream displays DTCs and freeze frame data. The DTCs and freeze frame data can be cleared with the Techstream INFO .

2. NORMAL MODE AND CHECK MODE

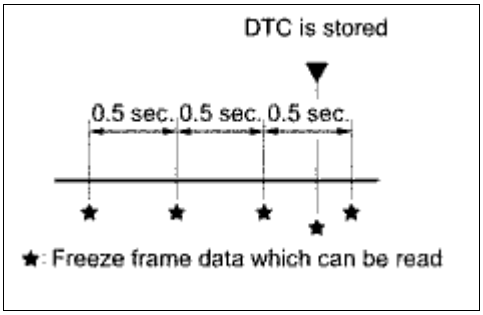
(a) The diagnosis system operates in "normal mode" during normal vehicle use. In normal mode, "2 trip detection logic" is used to ensure accurate detection of malfunctions. "Check mode" is also available to technicians as an option. In check mode, "1 trip detection logic" is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent malfunctions.

3. 2 TRIP DETECTION LOGIC

(a) When a malfunction is first detected, the malfunction is stored as a pending DTC in the ECM memory (1st trip). If the same malfunction is detected during the next drive cycle, the DTC is stored (2nd trip).

4. FREEZE FRAME DATA

(a) The Techstream records freeze frame data in 5 different instances: 1) 3 times before the DTC is stored, 2) once when the DTC is stored, and 3) once after the DTC is stored. These sets of data can be used to simulate the vehicle condition around the time when the malfunction occurred. The data may help in finding the cause of the malfunction, or in judging if the DTC was caused by a temporary malfunction.



5. CHECK DATA LINK CONNECTOR 3 (DLC3)

(a) Check the DLC3 INFO .

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Last Modified: 11-13-2015	6.6 S	**Doc ID:** RM000005VWL000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: DIAGNOSTIC TROUBLE CODE CHART; 2016 MY Tacoma [08/2015 -]		

DIAGNOSTIC TROUBLE CODE CHART

Manual Transmission System

DTC CODE	DETECTION ITEM	MIL	MEMORY	SEE PAGE
P03352A	Crankshaft Position Sensor "A" Signal Stuck in Range	Does not come on	DTC stored	INFO
P033531	Crankshaft Position Sensor "A" No Signal	Does not come on	DTC stored	INFO
P050031	Vehicle Speed Sensor "A" No Signal	Does not come on	DTC stored	INFO
U010087	Lost Communication With ECM/PCM "A" Missing Message	Does not come on	DTC stored	INFO

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Last Modified: 11-13-2015	6.6 D	**Doc ID:** RM000005VWN000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: DTC CHECK / CLEAR; 2016 MY Tacoma [08/2015 -]		

DTC CHECK / CLEAR

HINT:

- DTCs which are stored in the ECM can be displayed on the Techstream.
- The Techstream can display pending DTCs and current DTCs. Some DTCs are not stored unless a malfunction is detected in consecutive driving cycles. When a malfunction is detected in only one driving cycle, it is stored as a pending DTC.

1. CHECK DTC (Using Techstream)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Check for DTCs and freeze frame data, and write them down.

TECHSTREAM DISPLAY	DESCRIPTION
Test Failed	Shows the malfunction judgment results for the current trip.
Pending	Shows the malfunction judgment results from when the DTCs were last cleared up until they were checked. (Indicates the possibility of a malfunction when no DTCs are confirmed.)
Confirmed	Shows the DTCs confirmed up to now. (The number of current trips differs for each DTC.)

(f) Check the details of the DTCs INFO .

NOTICE:

When simulating a symptom and using the Techstream to check for DTCs, use normal mode. For DTCs in the Diagnostic Trouble Code Chart subject to "2 trip detection logic", perform the following:

Turn the ignition switch off after the symptom is simulated once. Then repeat the simulation process. When the symptom has been simulated twice, the MIL will illuminate and DTCs will be stored in the ECM.

2. CLEAR DTC (When Using Techstream)

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Clear DTCs.

(e) Clear the DTCs.

3. CLEAR DTC (When not Using Techstream)

(a) Perform either of the following operations:

NOTICE:

After turning ignition switch off, waiting time may be required before disconnecting the cable from the negative (-) battery terminal. Therefore, make sure to read the disconnecting the cable from the negative

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(-) battery terminal notices before proceeding with work INFO .

(1) Disconnect the cable from the negative (-) battery terminal for more than 1 minute.

(2) Remove the EFI NO. 1 and ETCS fuses from the engine room relay block, located inside the engine compartment, for more than 1 minute.

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Last Modified: 11-13-2015	6.6 F	**Doc ID:** RM000005VWK000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: HOW TO PROCEED WITH TROUBLESHOOTING; 2016 MY Tacoma [08/2015 -]		

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the manual transaxle system.

*: Use the Techstream.

1.	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2.	**CUSTOMER PROBLEM ANALYSIS**

(a) Refer to the How to Troubleshoot ECU Controlled Systems in Introduction section INFO .

NEXT

3.	**INSPECT BATTERY VOLTAGE**

(a) Measure the battery voltage.

Standard Voltage:
11 to 14 V

HINT:

If the voltage is below 11 V, recharge or replace the battery before proceeding to the next step.

NEXT

4.	**CHECK CAN COMMUNICATION SYSTEM***

(a) Using the Techstream, check if the CAN communication system is functioning normally.

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HINT:

- Refer to CAN Bus Check in CAN Communication System INFO .
- The ECM is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there are no malfunctions in the CAN communications system.

Result

RESULT	PROCEED TO
CAN communication system DTCs are not output.	A
CAN communication system DTCs are output.	B

B ▶ **GO TO CAN COMMUNICATION SYSTEM**

A
▼

5.	**CHECK AND CLEAR DTCS AND FREEZE FRAME DATA***

(a) Refer to DTC Check/Clear INFO .

NEXT
▼

6.	**SELECT CHECK MODE DIAGNOSIS***

(a) Refer to Check Mode Procedure INFO .

NEXT
▼

7.	**CHECK FOR DTC***

(a) Proceed to DTC Check/Clear INFO .

Result

RESULT	PROCEED TO
DTCs are not output.	A
DTCs are output.	B

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B ▶ GO TO STEP 12

A ▼

8.	SYMPTOM SIMULATION

(a) Refer to Symptom Simulation INFO .

NEXT ▼

9.	COMPONENT INSPECTION

NEXT ▼

10.	REPAIR OR REPLACE

NEXT ▼

11.	CONFIRMATION TEST

NEXT ▶ END

12.	DIAGNOSTIC TROUBLE CODE CHART

(a) Proceed to Diagnostic Trouble Code Chart INFO .

NEXT ▼

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13.	CIRCUIT INSPECTION*

NEXT

14.	IDENTIFICATION OF PROBLEM

NEXT

15.	REPAIR OR REPLACE

NEXT

16.	CONFIRMATION TEST

NEXT END

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005VWQ000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: P03352A,P033531; Crankshaft Position Sensor "A" Signal Stuck in Range; 2016 MY Tacoma [08/2015 -]		

DTC	**P03352A**	**Crankshaft Position Sensor "A" Signal Stuck in Range**

DTC	**P033531**	**Crankshaft Position Sensor "A" No Signal**

DESCRIPTION

The crankshaft position sensor system consists of a crankshaft position sensor plate and a pickup coil. The crankshaft position sensor plate has 34 teeth and is installed to the crankshaft. The pickup coil is made of wound copper wire, an iron core and a magnet. The crankshaft position sensor plate rotates and, as each tooth passes by the pickup coil, a pulse signal is created. The pickup coil generates 34 signals per crankshaft revolution. Based on these signals, the ECM calculates the crankshaft position and engine speed. Using these calculations, the fuel injection and ignition timing are controlled.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P03352A	No crankshaft position sensor signal to ECM while cranking (1 trip detection logic).	• SFI system • ECM	P0335
P033531	The engine stalls and the engine speed signal value decreases rapidly (1 trip detection logic).	• SFI system • ECM	P0335

MONITOR DESCRIPTION

A DTC will be stored if any of the following occur:

- The crankshaft position sensor signal (NE signal) is not received by the ECM when the engine is being cranked.
- The engine stalls and the engine speed signal value decreases rapidly (under normal conditions the engine speed will decrease gradually).

WIRING DIAGRAM

Refer to SFI system DTC P033511 INFO .

INSPECTION PROCEDURE

HINT:

- If no problem is found by this diagnostic troubleshooting procedure, check for problems by referring to the engine mechanical section.
- After performing repair, clear the DTCs and perform the following procedure to check that DTCs are not

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output.

a. Start the engine and wait for 3 seconds or more.
b. Check for DTCs again INFO .

1. DATA LIST

HINT:

The engine speed may be indicated as zero despite the engine running normally. This is caused by a lack of NE signals from the crankshaft position sensor. Alternatively, the engine speed may be indicated as lower than the actual engine speed if the crankshaft position sensor output voltage is insufficient.

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Start the engine.

(e) Enter the following menus: Powertrain / Engine / Data List / Engine Speed

Engine

TECHSTREAM DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Engine Speed	Engine speed Min.: 0 rpm Max.: 16383 rpm	500 to 600 rpm: Idling (shift lever in neutral, engine warmed up and A/C off)	When the crankshaft position sensor is malfunctioning, "Engine Speed" is approximately 0 rpm or varies greatly from the actual engine speed.

PROCEDURE

1.	**CHECK DTC OUTPUT (SFI SYSTEM)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Engine / Trouble Codes.

(e) Read the DTCs.

Result

RESULT	PROCEED TO
DTCs are not output	A
DTCs are output	B

B ▶ **GO TO SFI SYSTEM**

A ▶ **REPLACE ECM**

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005VWR000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: P050031; Vehicle Speed Sensor "A" No Signal; 2016 MY Tacoma [08/2015 -]		

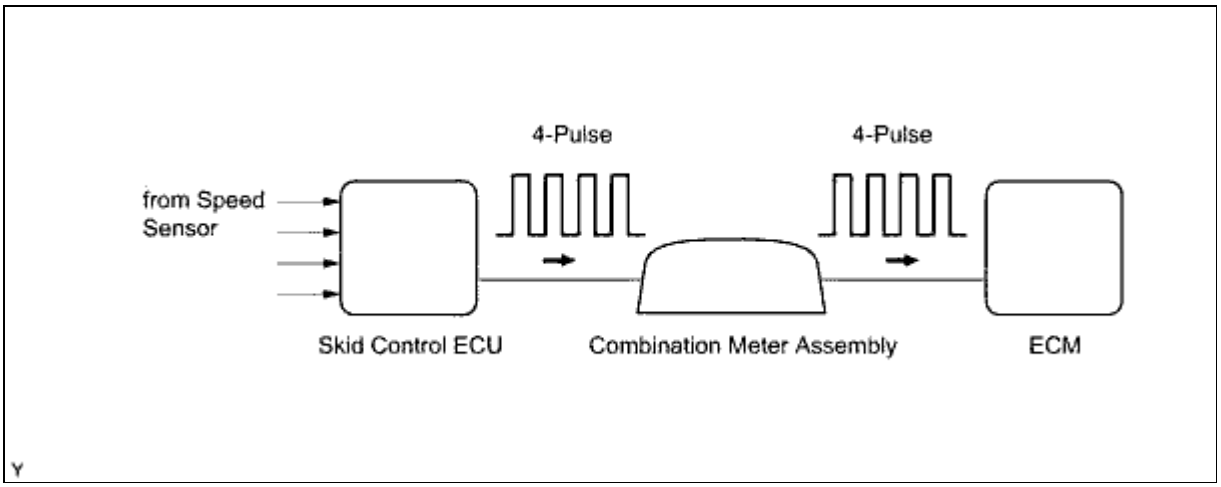
DTC	**P050031**	**Vehicle Speed Sensor "A" No Signal**

DESCRIPTION

Vehicles, which are equipped with ABS (Anti-lock Brake System), detect the vehicle speed using the skid control ECU (brake actuator assembly) and speed sensors. Each speed sensor monitors the wheel rotation speed and sends a signal to the skid control ECU. The skid control ECU converts the wheel speed signals into a 4-pulse signal and transmits it to the ECM via the combination meter assembly. The ECM determines the vehicle speed based on the frequency of the pulse signal.

HINT:

- Various systems use the vehicle speed signal distributed from the combination meter assembly. Check all the components possibly related to the speed signal.
- A voltage of 12 V or 5 V is output from each ECU and then input to the combination meter assembly. The signal is changed to a pulse signal at the transistor in the combination meter assembly. Each ECU controls the respective system based on the pulse signal.
- If a short occurs in any of the ECUs or in the wire harness connected to an ECU, all systems using the speed signal will not operate normally.



DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
P050031	While vehicle being driven, no vehicle speed sensor signal transmitted to ECM (2 trip detection logic).	• Open or short in speed signal circuit • Combination meter assembly • ECM	P0500

MONITOR DESCRIPTION

If there is no speed signal from the combination meter assembly even though the ECM determines that the

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vehicle is being driven, the ECM interprets this as a malfunction in the speed signal circuit. The ECM then stores this DTC.

WIRING DIAGRAM

Refer to Speed Signal Circuit INFO .

INSPECTION PROCEDURE

HINT:

After performing repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Turn the ignition switch to ON and wait for 3 seconds or more. (a)
2. Drive the vehicle for 6 seconds or more. (b)
3. Turn the ignition switch off.
4. Perform steps (a) and (b) again.
5. Check for DTCs again INFO .

PROCEDURE

1.	**READ VALUE USING TECHSTREAM (VEHICLE SPEED)**

(a) Drive the vehicle and check whether the operation of the speedometer in the combination meter assembly is normal.

HINT:

- The vehicle speed sensor is operating normally if the speedometer reading is normal.
- If the speedometer does not operate, check it by following the diagnostic procedure for a malfunction of the speedometer.

(b) Connect the Techstream to the DLC3.

(c) Turn the ignition switch to ON.

(d) Turn the Techstream on.

(e) Enter the following menus: Powertrain / Engine / Data List / Vehicle Speed.

Engine

TECHSTREAM DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Vehicle Speed	Vehicle speed Min.: 0 km/h (0 mph) Max.: 255 km/h (158 mph)	Actual vehicle speed	• This is the current vehicle speed. • The vehicle speed is detected using the wheel speed sensors. ○ There is a delay in when the vehicle speed data is displayed. Therefore, even if the vehicle speed listed in the freeze frame data is 0 km/h (0 mph), this does not always mean that the malfunction occurred when the vehicle was stopped.

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(f) Drive the vehicle.

(g) According to the display on the Techstream, read the Data List.

OK:

The values displayed on the Techstream and speedometer are equal.

NG ▶ **GO TO STEP 3**

OK ▼

2.	**CHECK DTC OUTPUT (DTC P050031)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(e) Read the DTCs.

Result

RESULT	PROCEED TO
DTCs are not output	A
DTC P050031 is output	B

B ▶ **REPLACE ECM**

A ▶ **CHECK FOR INTERMITTENT PROBLEMS**

3.	**CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - ECM)**

(a) Disconnect the C9 combination meter assembly connector.

(b) Disconnect the E13 ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C9-40 (+S) - E13-24 (SPD)	Always	Below 1 Ω

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NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ▼

4.	CHECK METER / GAUGE SYSTEM

(a) Proceed to Speed Signal Circuit in Meter / Gauge System INFO .

NEXT ▼

5.	CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Turn the Techstream on.

(d) Clear the DTCs

(e) Turn the ignition switch off and wait for at least 30 seconds.

(f) Start the engine.

(g) Turn the Techstream on.

(h) Drive the vehicle for 6 seconds or more.

(i) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(j) Read the DTCs.

HINT:

If no DTCs (no pending DTCs) are output, the repair has been successfully completed.

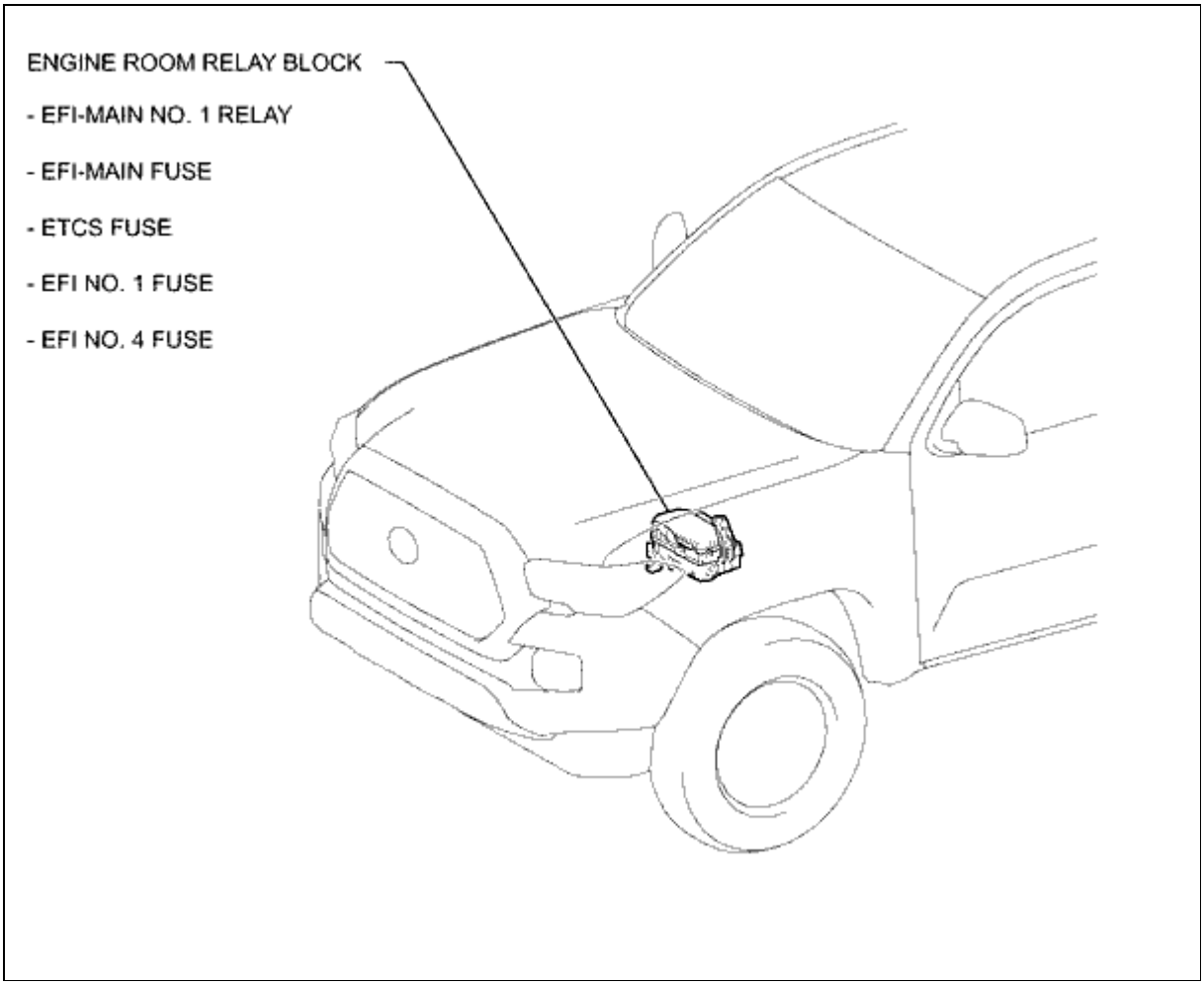
NEXT ▶ END

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Last Modified: 11-13-2015	6.6 R	**Doc ID:** RM000005VWF000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: PARTS LOCATION; 2016 MY Tacoma [08/2015 -]		

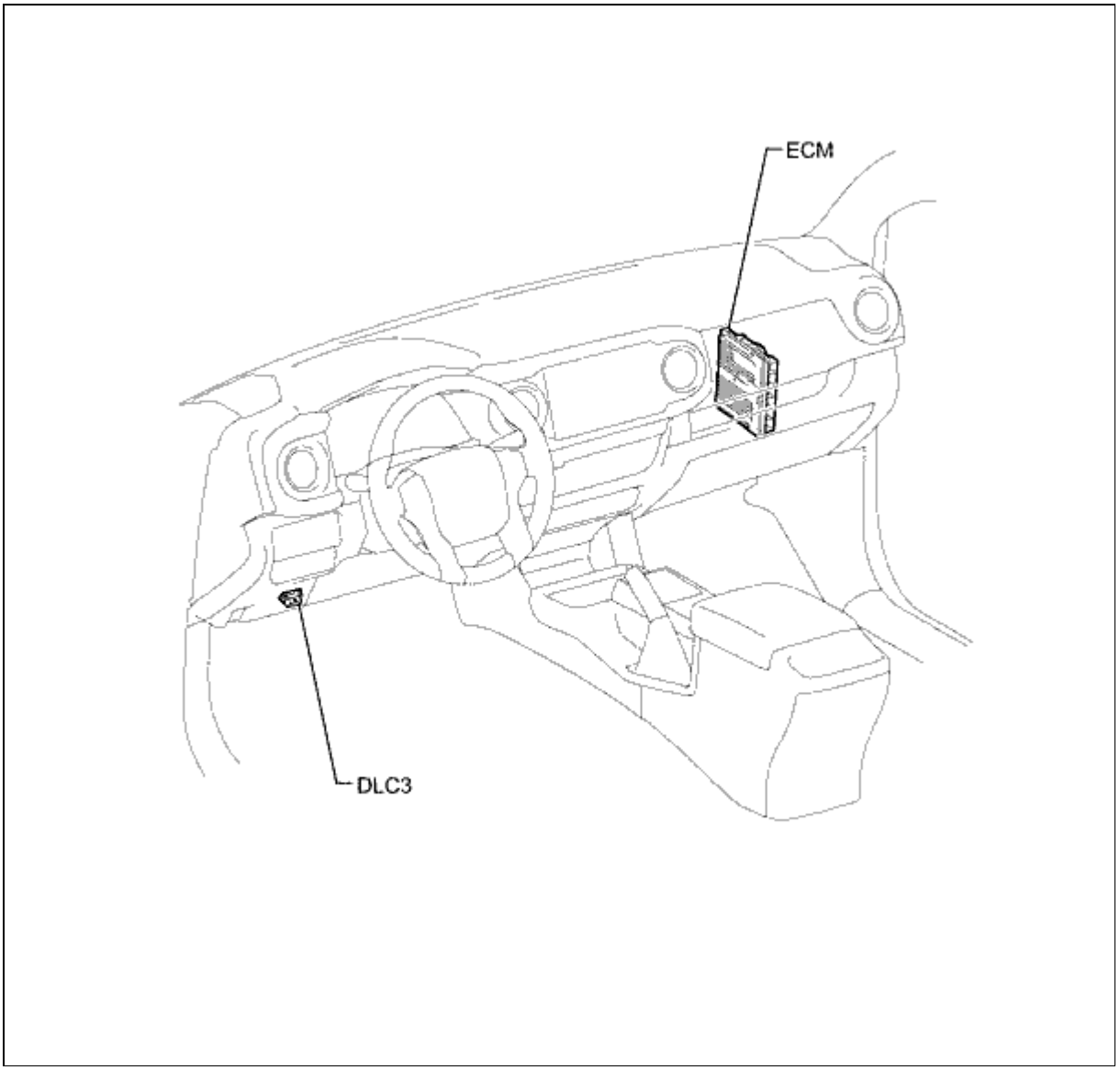
PARTS LOCATION

ILLUSTRATION



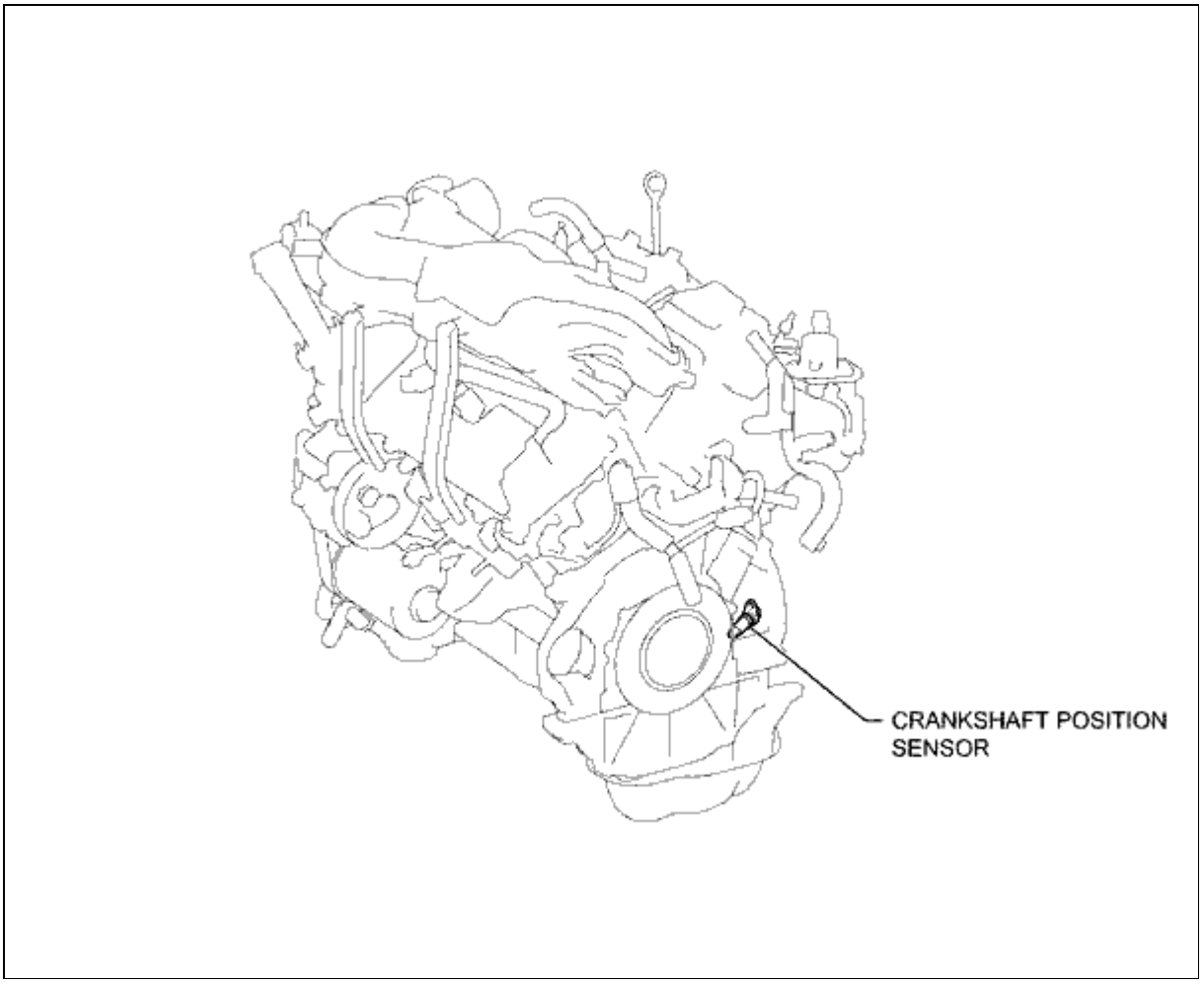
ILLUSTRATION

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Last Modified: 11-13-2015	6.6 L	**Doc ID:** RM000005VWE000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: PRECAUTION; 2016 MY Tacoma [08/2015 -]		

PRECAUTION

1. INITIALIZATION

NOTICE:

- If the ECM is replaced, register the ECU communication ID for Engine Immobiliser System INFO .
- Perform Registration (VIN registration) when replacing the ECM INFO .

HINT:

- The engine learned value cannot be reset by disconnecting the battery negative (-) terminal or removing the EFI NO. 1 and ETCS fuses.
- Refer to Initialization to perform Learning Value Reset and idle learning INFO .

2. WHEN USING TECHSTREAM

CAUTION:

Observe the following items for safety reasons:

- Before using the Techstream, read the instruction manual.
- Prevent the Techstream cable from being caught on the pedals, shift lever or steering wheel when driving with the Techstream connected to the vehicle.
- When driving the vehicle for testing purposes using the Techstream, 2 persons are required. One is for driving the vehicle, and the other operates the Techstream.

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Last Modified: 11-13-2015	6.6 T	**Doc ID:** RM000005VWH000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: PROBLEM SYMPTOMS TABLE; 2016 MY Tacoma [08/2015 -]		

PROBLEM SYMPTOMS TABLE

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Manual Transmission System

SYMPTOM	SUSPECTED AREA	SEE PAGE
Abnormal noise	Oil level (Low)	INFO
	Oil (Wrong)	-
	Gear (Input shaft) (worn or damaged)	INFO
	Gear (Output shaft) (worn or damaged)	INFO
	Gear (Counter shaft) (worn or damaged)	INFO
	Bearing (worn or damaged)	INFO
	Bearing (Input shaft) (worn or damaged)	INFO
	Bearing (Output shaft) (worn or damaged)	INFO
	Bearing (Counter shaft) (worn or damaged)	INFO
Oil leakage	Oil level (High)	INFO
	Gasket (Damaged)	INFO
	O-ring (Worn or damaged)	INFO
Hard shifting or will not shift	Shift fork (Input shaft) (Worn)	INFO
	Shift fork (Counter shaft) (Worn)	INFO
	Synchronizer ring (Input shaft) (worn or damaged)	INFO
	Synchronizer ring (Output shaft) (worn or damaged)	INFO
	Synchronizer ring (Counter shaft) (worn or damaged)	INFO
	Shift key spring (Input shaft) (damaged)	INFO
	Shift key spring (Counter shaft) (damaged)	INFO
Jumps out of gear	Shift fork (Input shaft) (Worn)	INFO
	Shift fork (Counter shaft) (Worn)	INFO
	Gear (Input shaft) (worn or damaged)	INFO
	Gear (Output shaft) (worn or damaged)	INFO
	Gear (Counter shaft) (worn or damaged)	INFO
	Bearing (Input shaft) (worn or damaged)	INFO

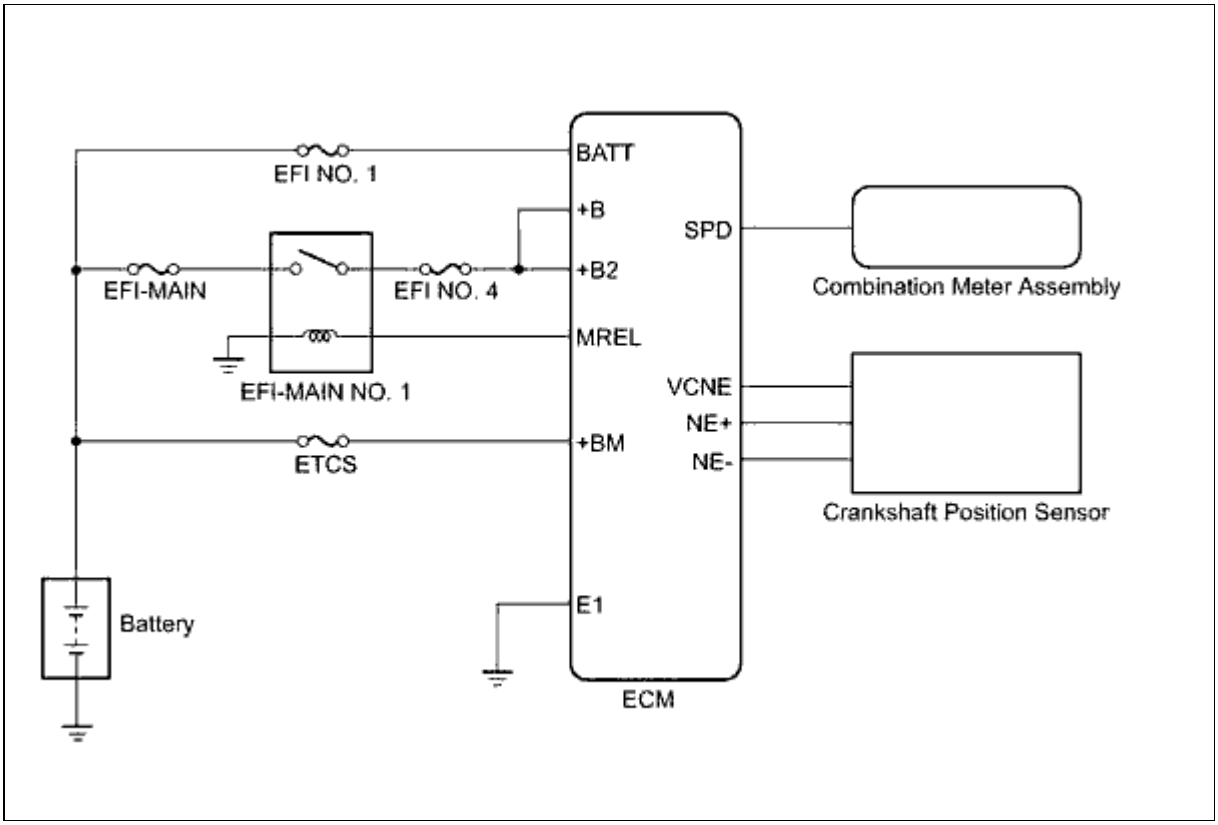
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SYMPTOM	SUSPECTED AREA	SEE PAGE
	Bearing (Output shaft) (worn or damaged)	INFO
	Bearing (Counter shaft) (worn or damaged)	INFO

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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000005VWG000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: SYSTEM DIAGRAM; 2016 MY Tacoma [08/2015 -]		

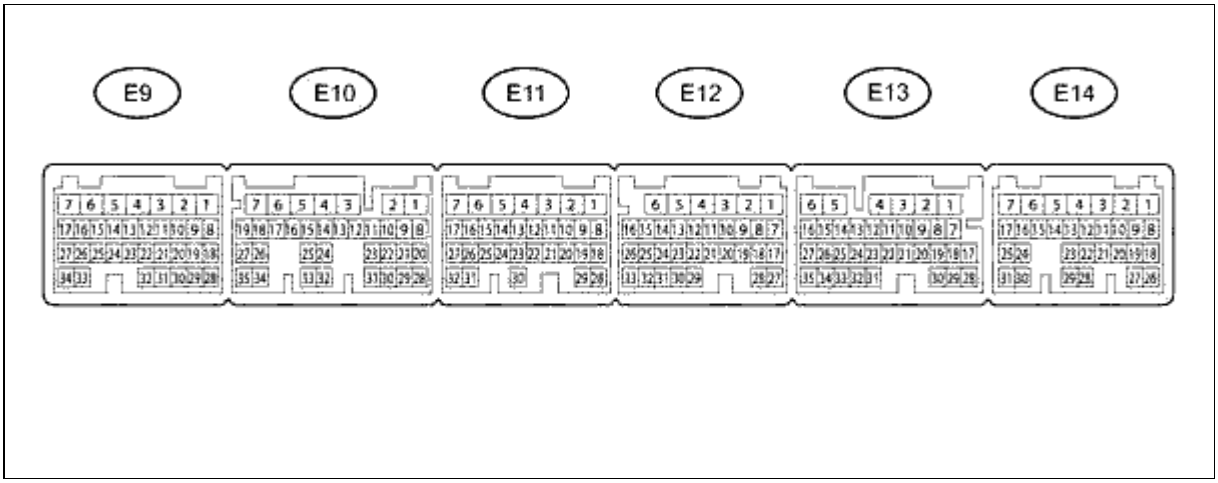
SYSTEM DIAGRAM



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Last Modified: 11-13-2015	6.6 U	**Doc ID:** RM000005VWI000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: TERMINALS OF ECM; 2016 MY Tacoma [08/2015 -]		

TERMINALS OF ECM



HINT:

The standard normal voltage between each pair of ECM terminals is shown in the table below. The appropriate conditions for checking each pair of terminals are also indicated. The result of checks should be compared with the standard normal voltage for that pair of terminals, displayed in the Specified Condition column. The illustration above can be used as a reference to identify the ECM terminal locations.

TERMINAL NO. (SYMBOL)	WIRING COLOR	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
E14-2 (BATT) - E11-1 (E1)	L - W-B	Battery (for measuring battery voltage and for ECM memory)	Always	11 to 14 V
E12-6 (+BM) - E11-1 (E1)	GR - W-B	Power source of throttle actuator	Always	11 to 14 V
E14-3 (+B) - E11-1 (E1)	B - W-B	Power source of ECM	Ignition switch ON	11 to 14 V
E14-4 (+B2) - E11-1 (E1)	B - W-B	Power source of ECM	Ignition switch ON	11 to 14 V
E14-25 (MREL) - E11-1 (E1)	GR - W-B	EFI-MAIN NO. 1 relay operation signal	Ignition switch ON	11 to 14 V
E9-26 (VCNE) - E11-1 (E1)	R - W-B	Power source of crankshaft position sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V
E9-25 (NE+) - E9-33 (NE-)	B - G	Crankshaft position sensor	Idling	Pulse generation
E13-24 (SPD) - E11-1 (E1)	R - W-B	Vehicle speed signal from combination meter assembly	Driving at 20 km/h (12 mph)	Pulse generation
E11-1 (E1) - Body ground	W-B - Body ground	Ground circuit of ECM	Always	Below 1 Ω

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Last Modified: 11-13-2015	6.6 C	**Doc ID:** RM000005VWS000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION SYSTEM: U010087; Lost Communication With ECM/PCM "A" Missing Message; 2016 MY Tacoma [08/2015 -]		

DTC	**U010087**	**Lost Communication With ECM/PCM "A" Missing Message**

DESCRIPTION

The engine control unit and transmission control unit are located inside the ECM. The engine control unit intercommunicates with the transmission control ECU via CAN communication. If there is a problem in this intercommunication, the ECM stores this DTC.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA	SAE
U010087	Following conditions are met for 1.25 seconds (1 trip detection logic): 1. The ignition switch is ON 2. Battery voltage is 9.5 V or more 3. No communication between engine control unit and transmission control unit	ECM	U0100

INSPECTION PROCEDURE

HINT:

After the repair, clear the DTCs and perform the following procedure to check that DTCs are not output.

1. Check that the battery voltage is 9.5 V or more.
2. Turn the ignition switch to ON.
3. Check for DTCs again INFO .

PROCEDURE

1.	**CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC U010087)**

(a) Connect the Techstream to the DLC3.

(b) Turn the ignition switch to ON.

(c) Enter the following menus: Powertrain / Transmission / Trouble Codes.

(d) Check if DTCs are output.

Result

RESULT	PROCEED TO
Only DTC U010087 is output	A
DTC U010087 and other DTCs are output	B

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B ▶ GO TO DTC CHART

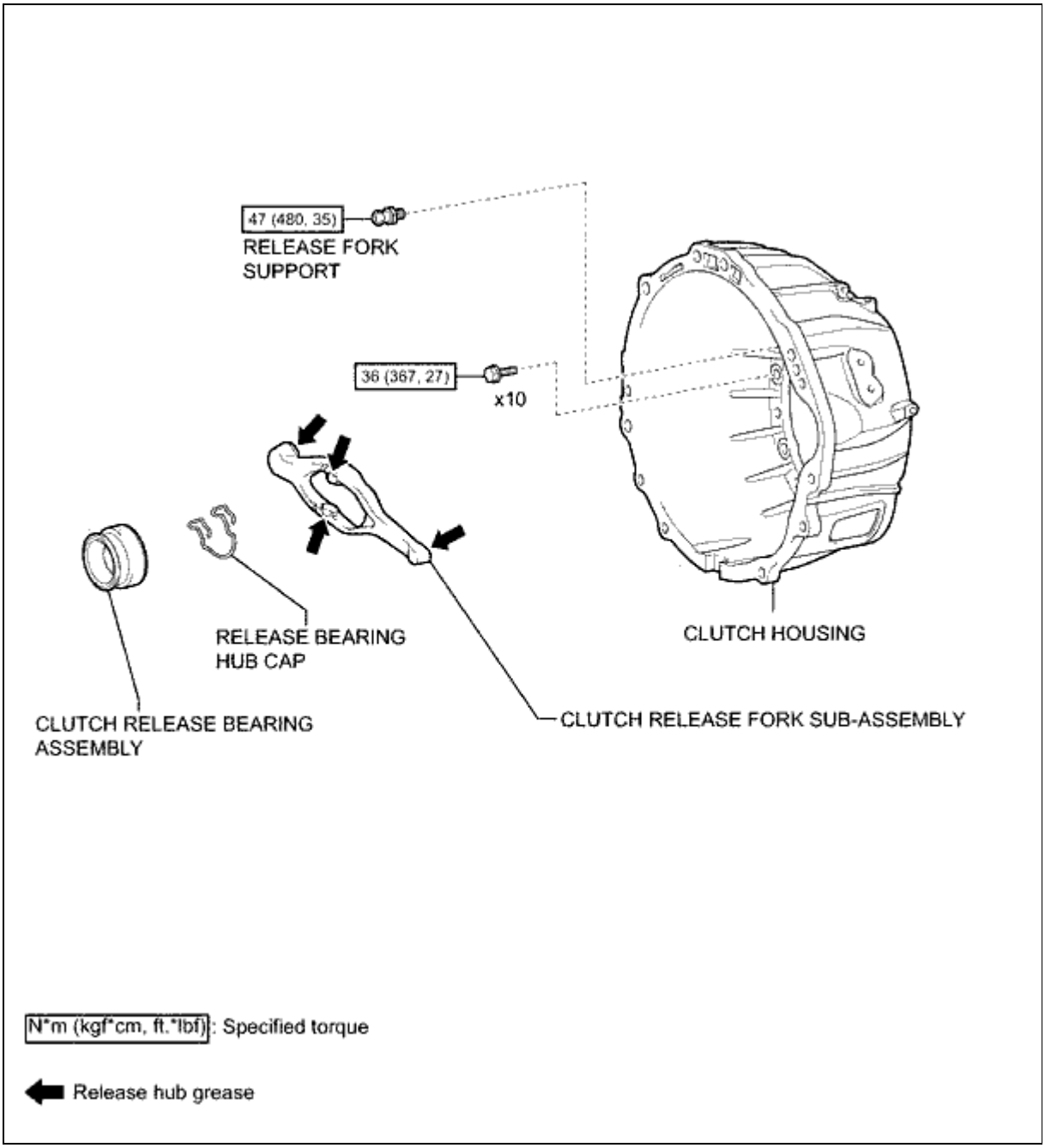
A ▶ REPLACE ECM

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM00000177P00FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

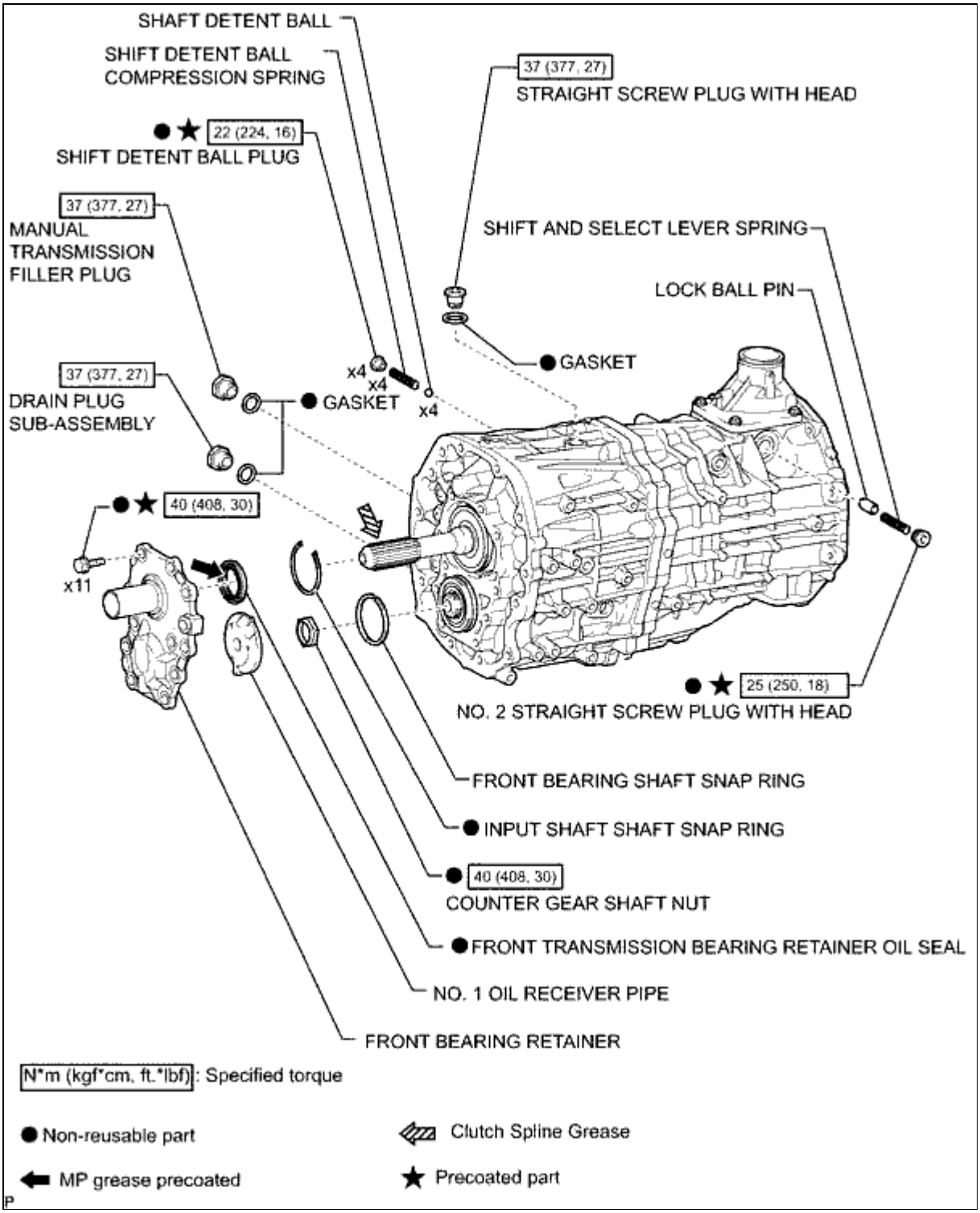
COMPONENTS

ILLUSTRATION



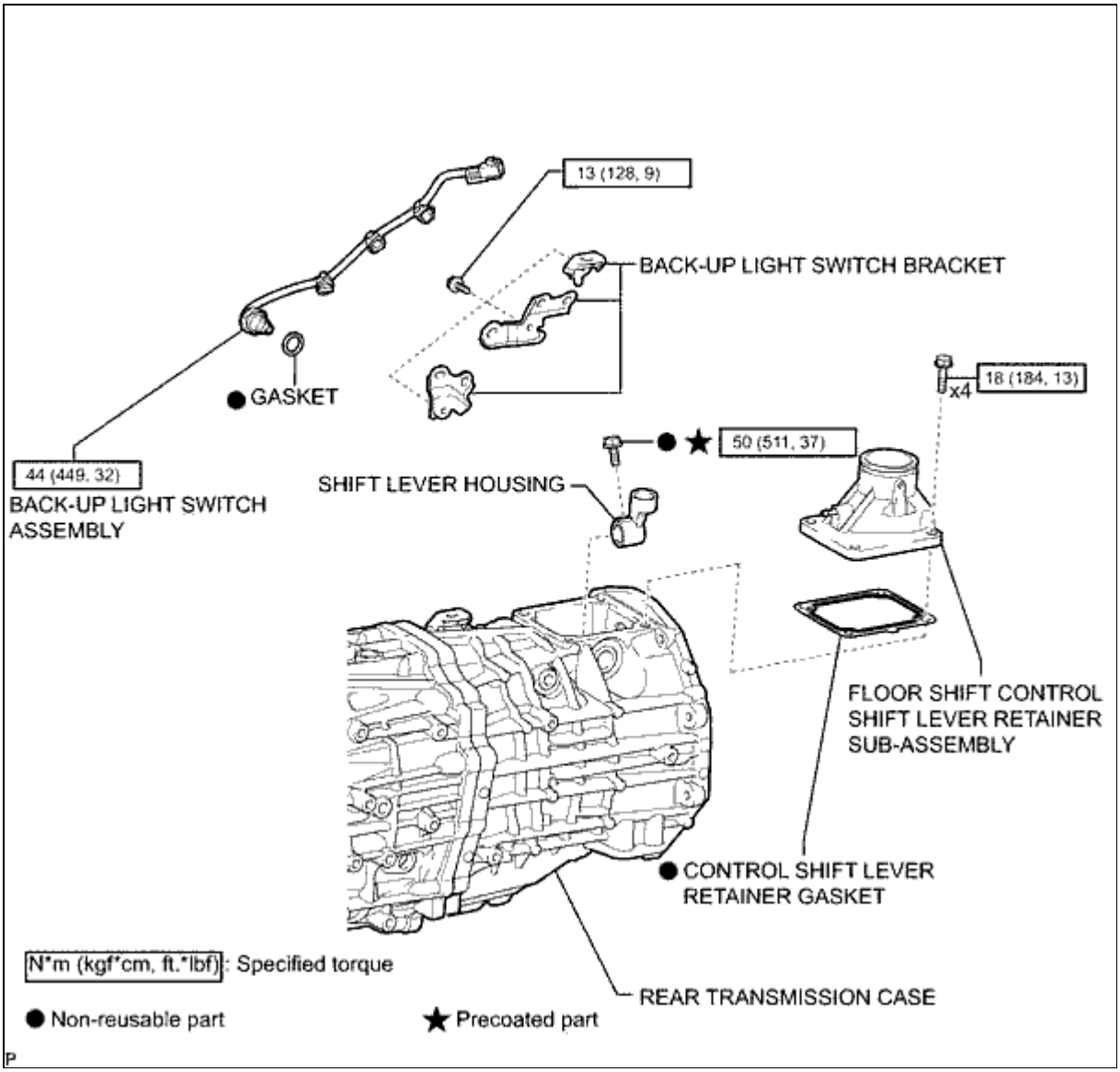
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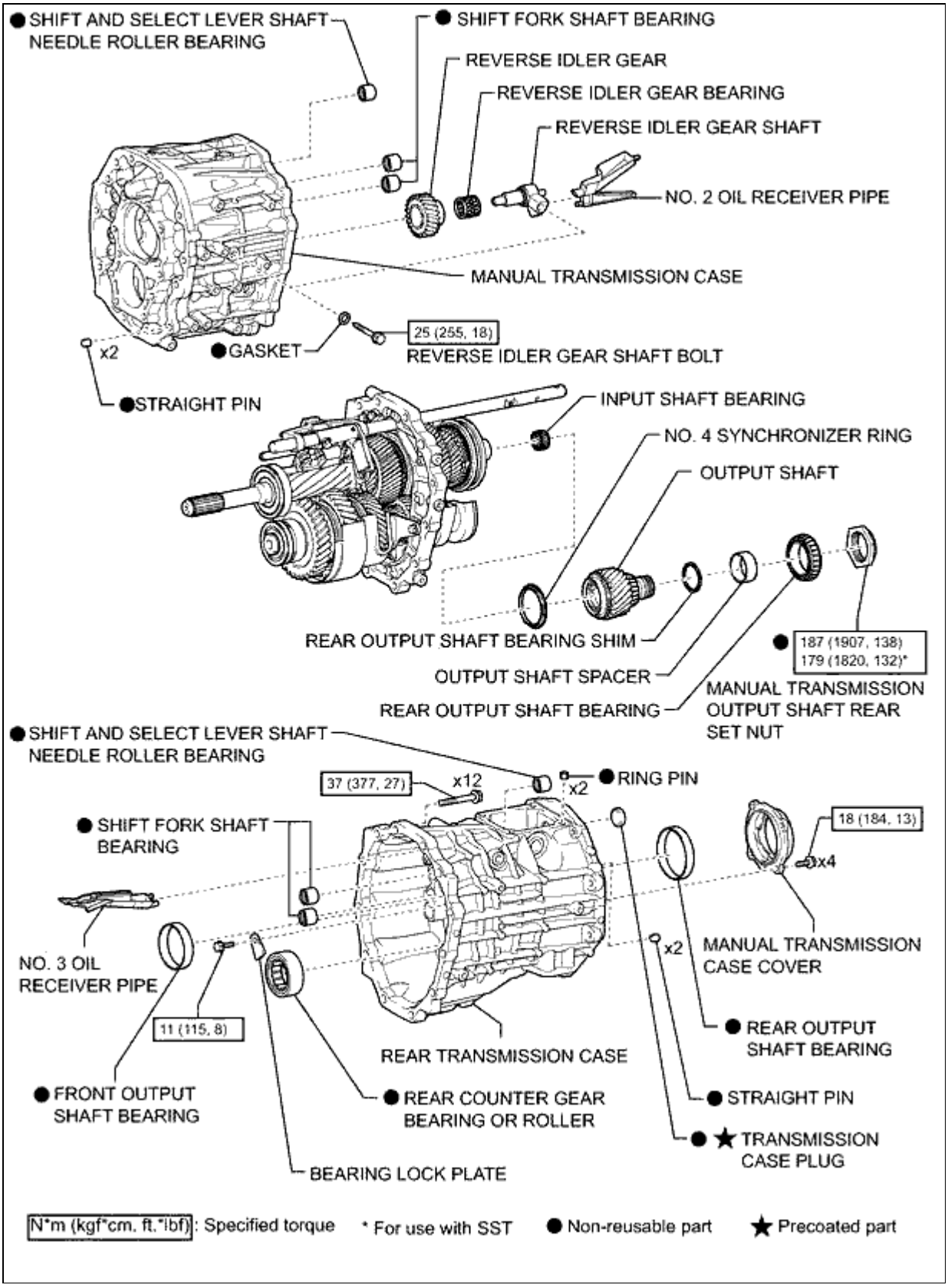
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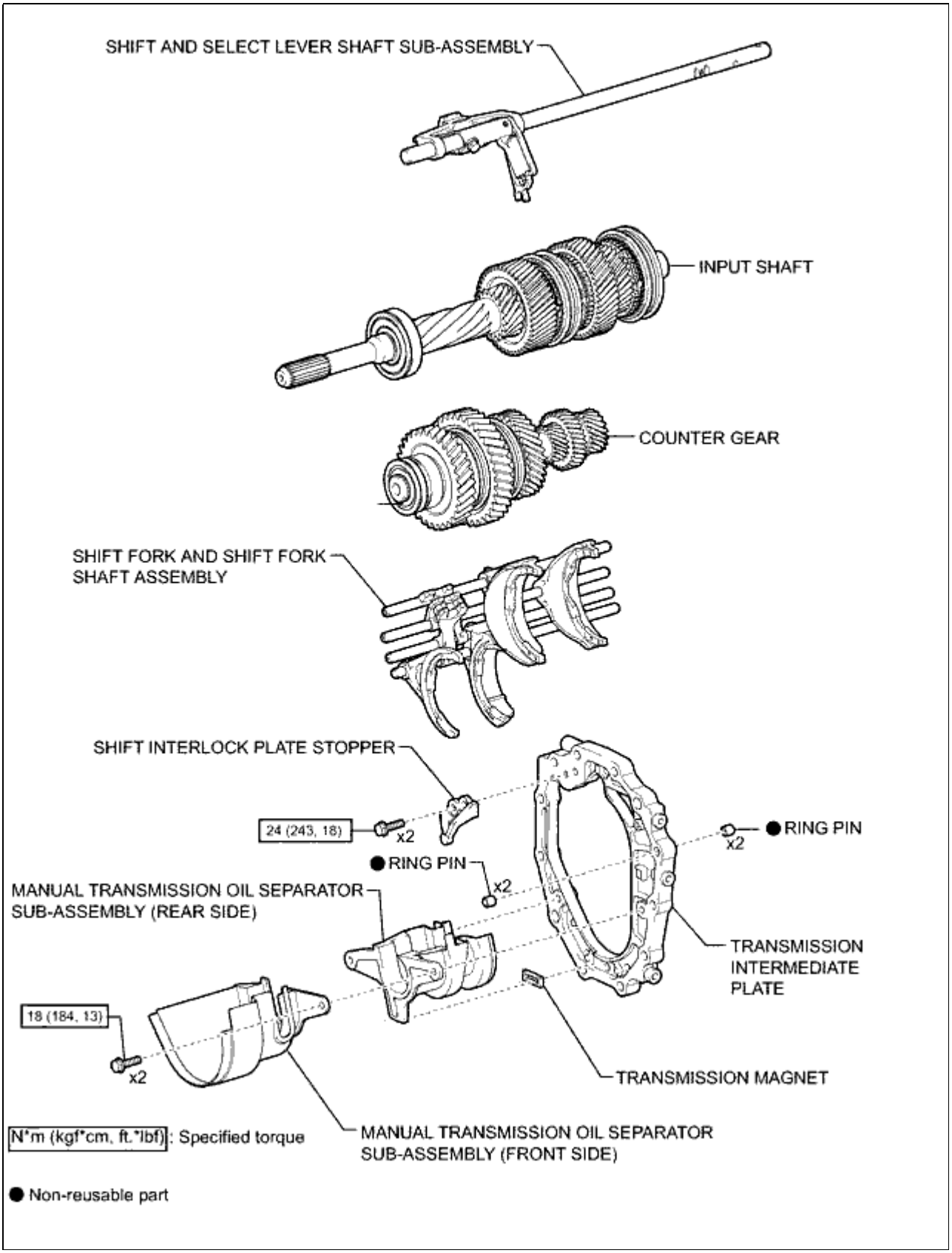
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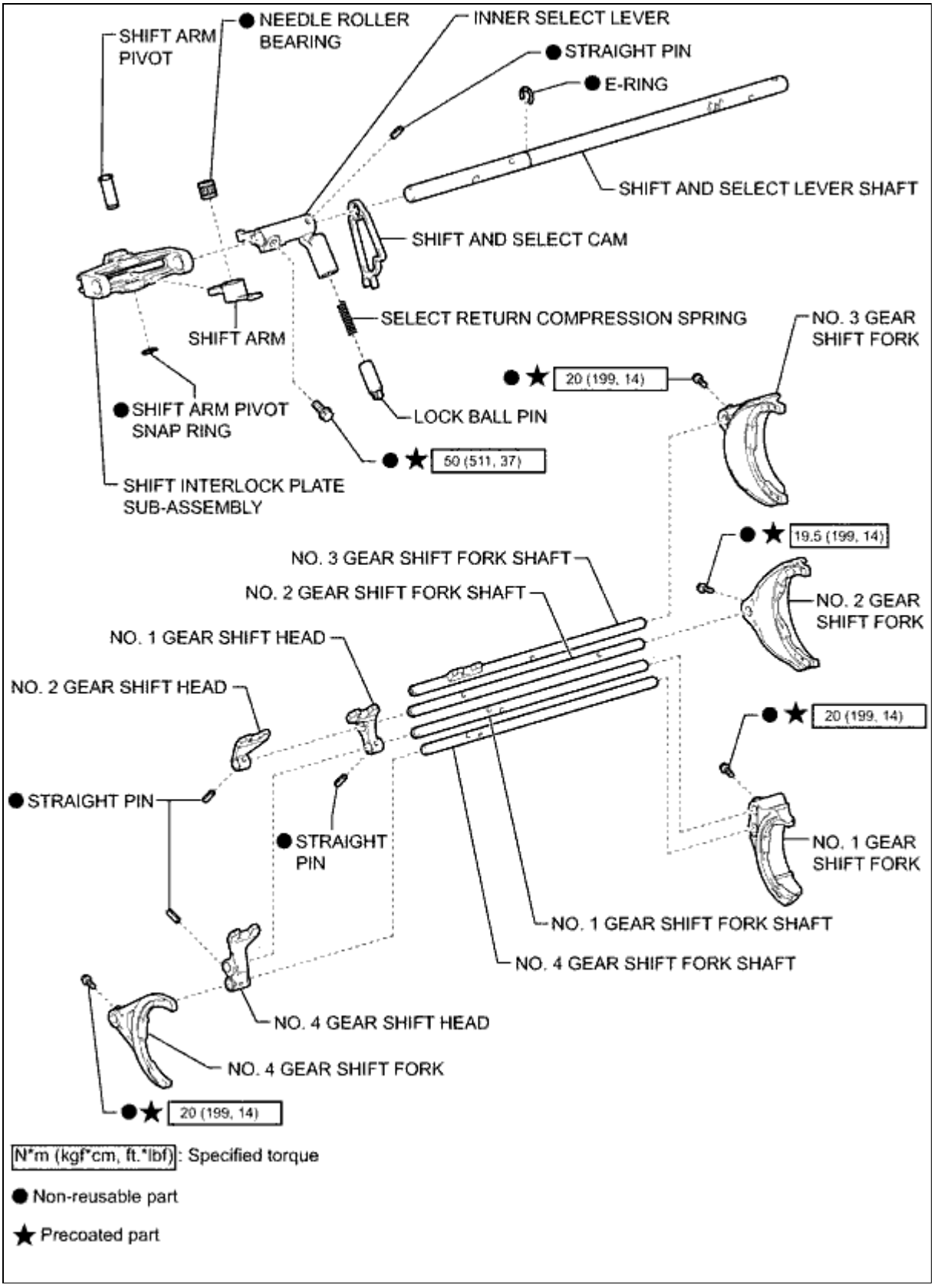
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177Q00FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

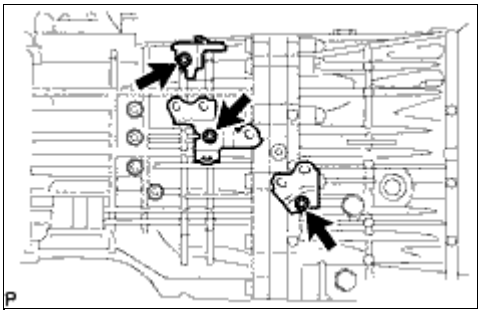
1. REMOVE CLUTCH RELEASE FORK SUB-ASSEMBLY INFO

2. REMOVE BACK-UP LIGHT SWITCH ASSEMBLY

INFO

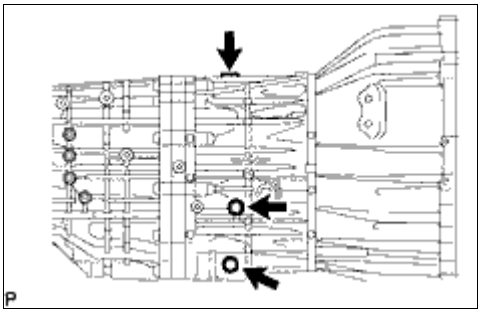
3. REMOVE BACK-UP LIGHT SWITCH BRACKET

(a) Remove the 3 bolts and back-up light switch brackets.



4. REMOVE MANUAL TRANSMISSION CASE PLUG

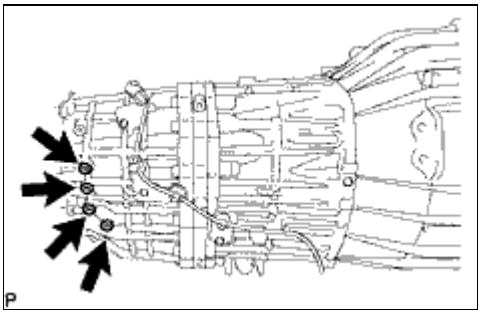
(a) Remove the manual transmission filler plug, drain plug sub-assembly and 2 gaskets from the manual transmission case sub-assembly.



(b) Using a 10 mm hexagon wrench, remove the straight screw plug with head from the rear transmission case.

5. REMOVE SHAFT DETENT BALL

(a) Using a 6 mm hexagon wrench, remove the 4 shift detent ball plugs from the rear transmission case.

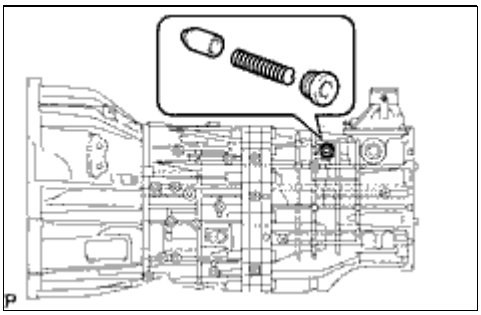


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(b) Remove the 4 shift detent ball compression springs and 4 shift detent balls from the rear transmission case.

6. REMOVE LOCK BALL PIN

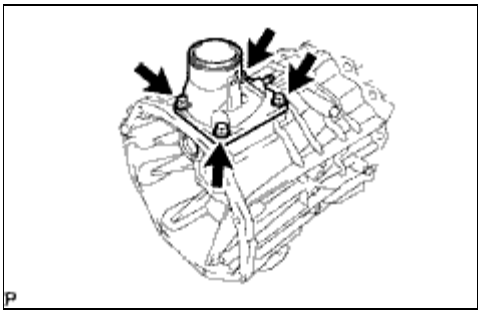
(a) Using a 10 mm hexagon wrench, remove the No. 2 straight screw plug with head from the rear transmission case.



(b) Remove the lock ball pin and shift and select lever spring from the rear transmission case.

7. REMOVE FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY

(a) Remove the 4 bolts, floor shift control shift lever retainer sub-assembly and control shift lever retainer gasket from the rear transmission case.

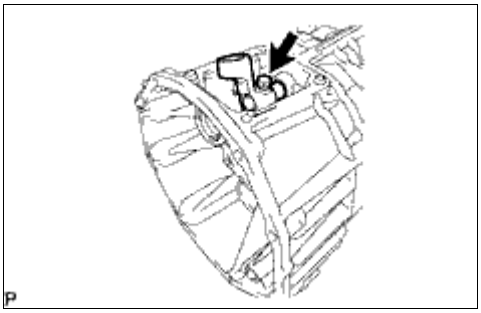


8. REMOVE SHIFT LEVER HOUSING

(a) Remove the bolt and shift lever housing.

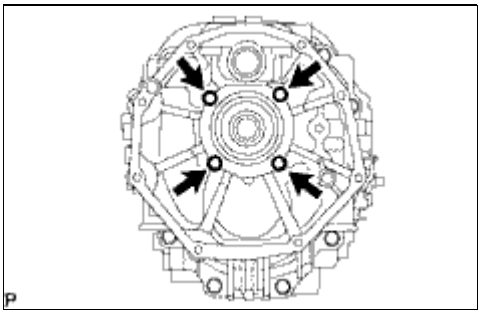
NOTICE:

Do not damage the sealing surface of the control shift lever retainer sub-assembly.



9. REMOVE MANUAL TRANSMISSION CASE COVER

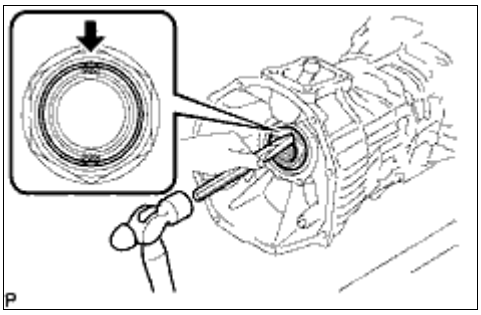
(a) Remove the 4 bolts and manual transmission case cover from the rear transmission case.



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10. UNSTAKE MANUAL TRANSMISSION OUTPUT SHAFT REAR SET NUT

(a) Using a chisel and hammer, unstake the manual transmission output shaft rear set nut.



11. REMOVE MANUAL TRANSMISSION OUTPUT SHAFT REAR SET NUT

(a) Engage the gear, and then secure the input shaft using SST.

Text in Illustration

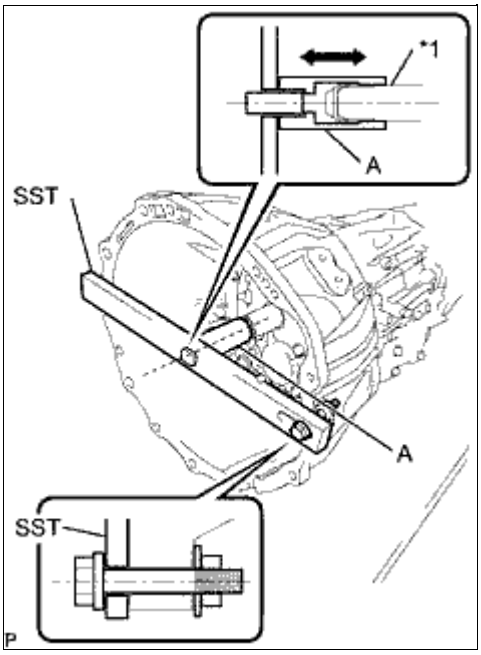
*1	Input Shaft

SST: 09322-35010

09322-03010
09322-03020
09322-03030
90105-12087
90170-12030
94622-51200

HINT:

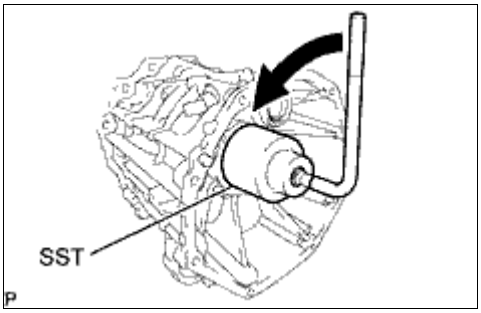
- Install SST securely so that the part labeled A is in-line with the input shaft.
- Make sure that the part labeled A moves back and forth by hand after installing SST.



(b) Using SST, remove the manual transmission output shaft rear set nut from the output shaft.

SST: 09326-35010

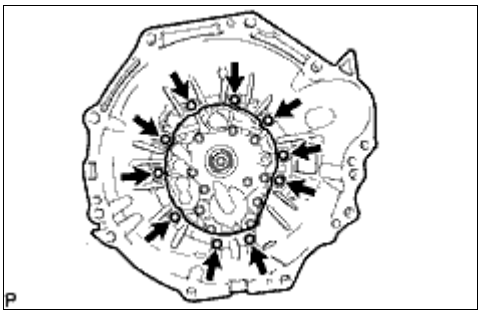
09326-03010



12. REMOVE CLUTCH HOUSING

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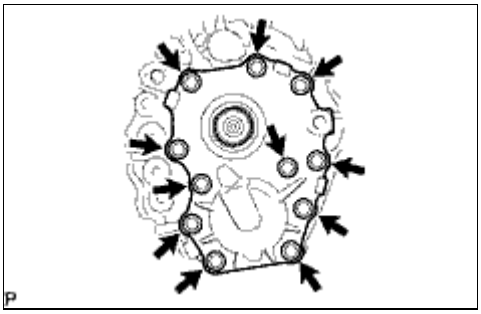
(a) Remove the 10 bolts.



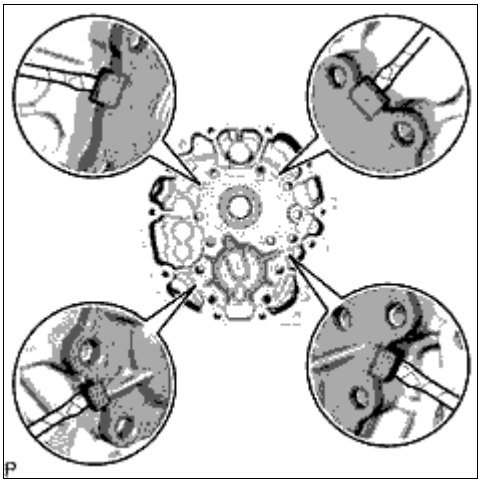
(b) Using a plastic-faced hammer, carefully tap off the clutch housing to remove it.

13. REMOVE FRONT BEARING RETAINER

(a) Remove the 11 bolts.



(b) Using a screwdriver wrapped in protective tape, remove the front bearing retainer by prying the points in the illustration.



NOTICE:

- Do not damage the sealing surface of the clutch housing and manual transmission case sub-assembly.
- Do not damage the sealing surface of the front bearing retainer and manual transmission case sub-assembly.

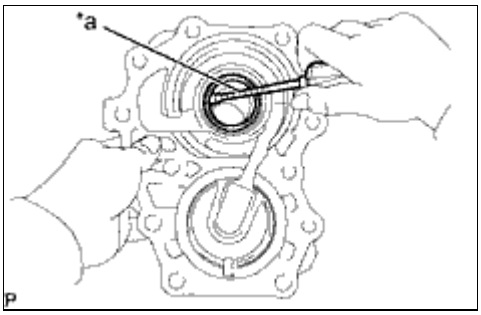
14. REMOVE NO. 1 OIL RECEIVER PIPE

(a) Remove the No. 1 oil receiver pipe from the front bearing retainer.

15. REMOVE FRONT TRANSMISSION BEARING RETAINER OIL SEAL

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(a) Using a screwdriver, pry out the front transmission bearing retainer oil seal.



Text in Illustration

*a	Protective Tape

NOTICE:

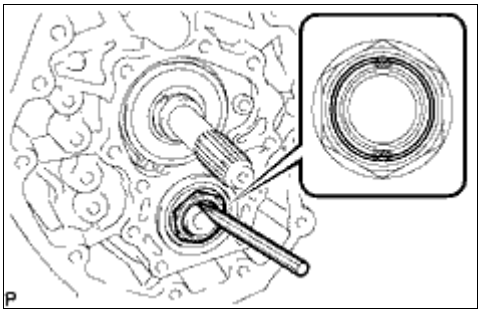
Do not damage the lip of the front transmission bearing retainer oil seal and front bearing contact surfaces.

HINT:

Tape the screwdriver tip before use.

16. REMOVE COUNTER GEAR SHAFT NUT

(a) Using a chisel and hammer, unstake the counter gear shaft nut.

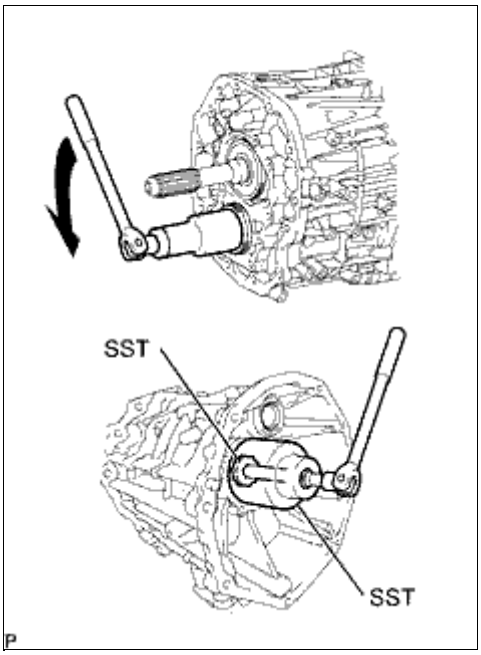


(b) Using SST, hold the output shaft.

SST: 09326-35010

09326-03010

SST: 09326-71030

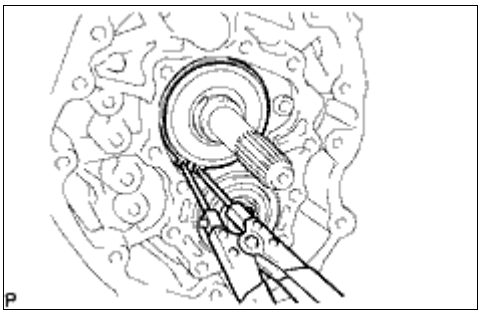


(c) Using a 41 mm socket wrench, remove the counter gear shaft nut.

17. REMOVE INPUT SHAFT SHAFT SNAP RING

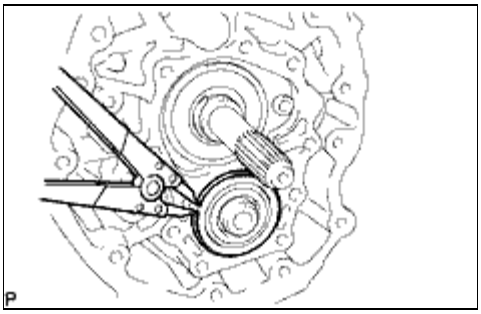
cardiagn.com

(a) Using snap ring pliers, remove the input shaft shaft snap ring.



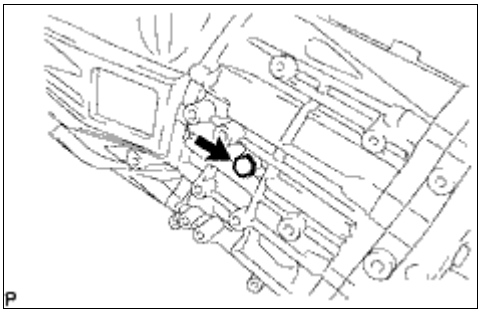
18. REMOVE FRONT BEARING SHAFT SNAP RING

(a) Using a snap ring expander, remove the front bearing shaft snap ring.



19. REMOVE REVERSE IDLER GEAR SHAFT BOLT

(a) Remove the reverse idler gear shaft bolt and gasket from the reverse idler gear shaft.

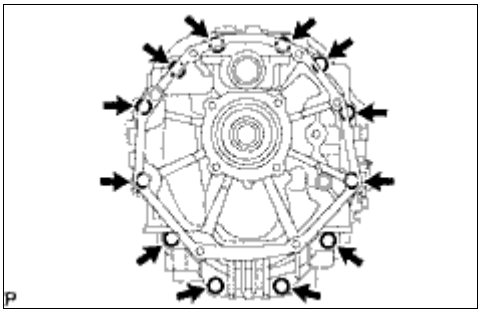


20. REMOVE MANUAL TRANSMISSION CASE SUB-ASSEMBLY

CAUTION:

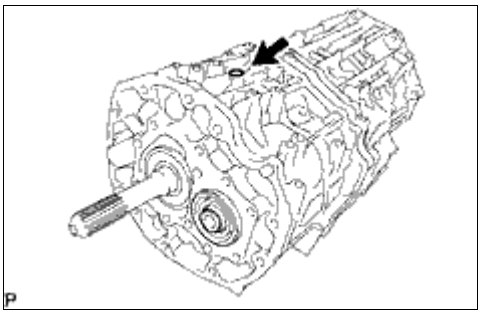
Since the manual transmission unit is very heavy, 2 people are needed to remove the manual transmission case sub-assembly.

(a) Remove the 12 bolts.

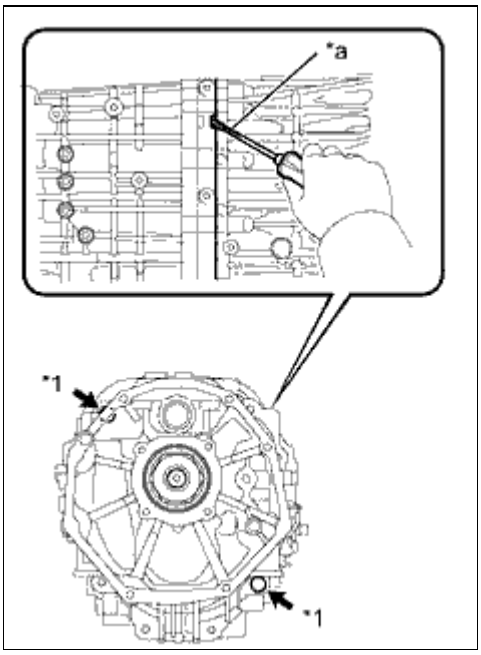


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(b) In order to prevent the reverse idler gear from falling when removing the transmission case, set the manual transmission assembly on its side so that the installation hole of the reverse idler gear stopper bolt is facing upward as shown in the illustration.



(c) Using a screwdriver wrapped in protective tape, separate the transmission case sub-assembly and intermediate plate by prying at the points shown in the illustration.



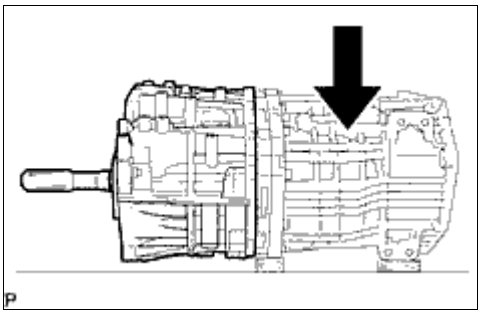
Text in Illustration

*1	Straight Pin
*a	Protective Tape

NOTICE:

Do not damage the sealing surfaces of the manual transmission case sub-assembly and transmission intermediate plate.

(d) Place wooden blocks or other objects underneath the rear transmission case to securely support it as shown in the illustration.



(e) Remove the manual transmission case sub-assembly from the rear transmission case.

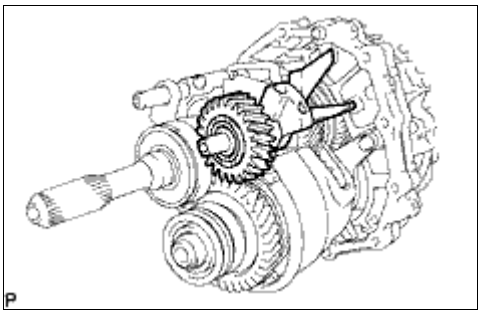
21. REMOVE REVERSE IDLER GEAR

CAUTION:

Since the manual transmission is very heavy, perform these procedures with 2 people. While one person is removing the reverse idler gear, have the other person hold the transmission in place.

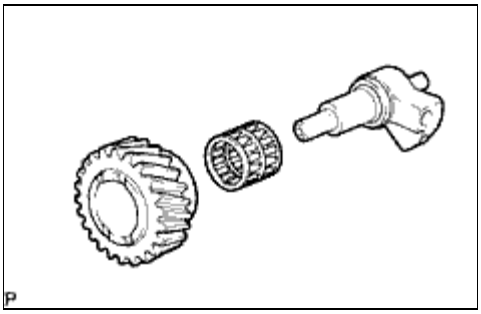
cardiagn.com

(a) Remove the reverse idler gear and front oil receiver from the transmission unit.



(b) Remove the No. 2 oil receiver from the reverse idler gear shaft.

(c) Remove the reverse idler gear bearing and reverse idler gear from the reverse idler gear shaft.

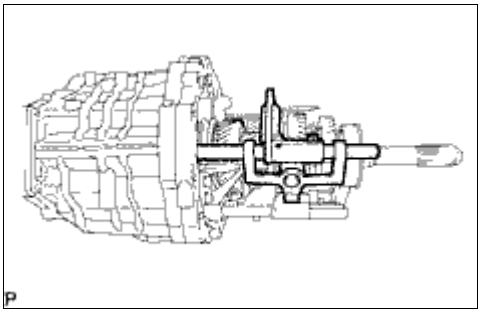


22. REMOVE SHIFT AND SELECT LEVER SHAFT

(a) Remove the shift and select lever shaft sub-assembly from the transmission unit.

CAUTION:

Since the manual transmission is very heavy, perform these procedures with 2 people. While one person is removing the shift and select shaft, have the other person hold the transmission in place.

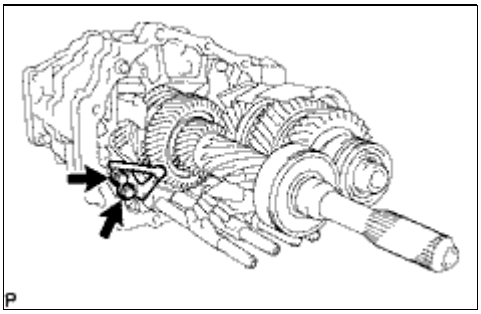


23. REMOVE SHIFT INTERLOCK PLATE STOPPER

(a) Remove the 2 bolts and shift interlock plate stopper from the transmission unit.

CAUTION:

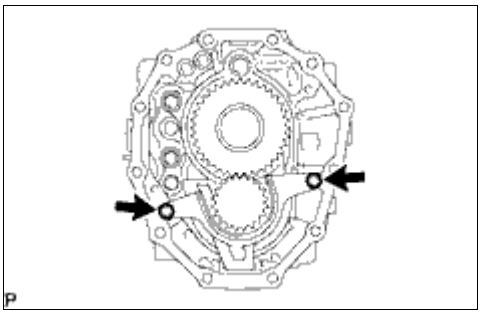
Since the manual transmission is very heavy, perform these procedures with 2 people. While one person is removing the shift interlock plate stopper, have the other person hold the transmission in place.



24. REMOVE MANUAL TRANSMISSION OIL SEPARATOR SUB-ASSEMBLY

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(a) Remove the 2 bolts and transmission oil separator sub-assembly (front side).

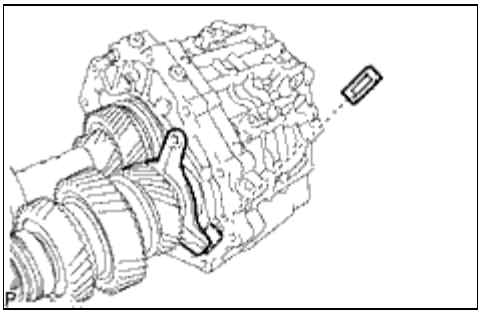


CAUTION:

Since the manual transmission is very heavy, perform these procedures with 2 people. While one person is removing the manual transmission oil separator sub-assembly, have the other person hold the transmission in place.

25. REMOVE TRANSMISSION MAGNET

(a) Remove the transmission magnet from the transmission intermediate plate.



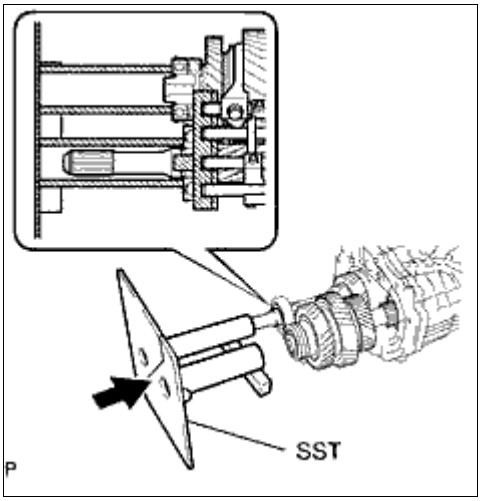
CAUTION:

Since the manual transmission is very heavy, perform these procedures with 2 people. While one person is removing the transmission magnet, have the other person hold the transmission in place.

26. REMOVE REAR TRANSMISSION CASE

(a) Using SST, set the transmission unit.

SST: 09310-71010



CAUTION:

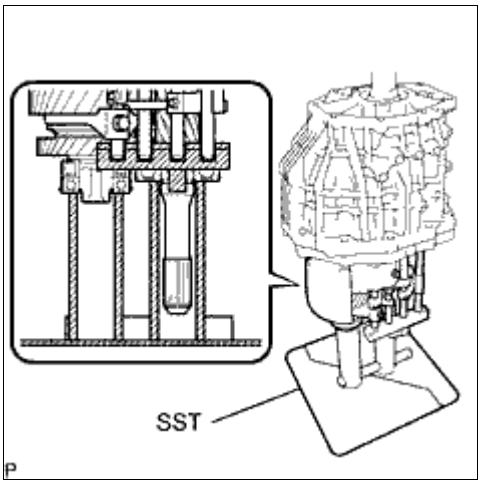
Since the manual transmission unit is very heavy, 2 people are needed to set the transmission unit.

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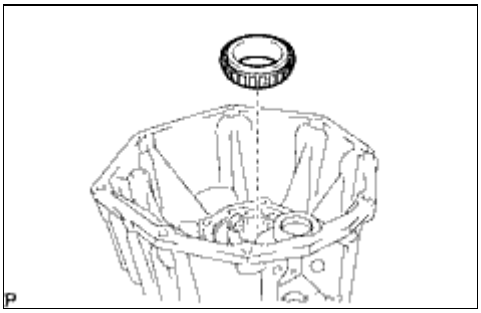
(b) Stand the manual transmission upright as shown in the illustration.

CAUTION:

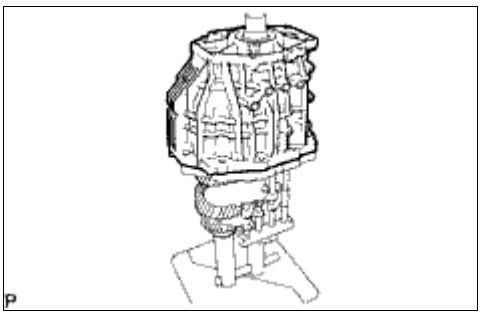
Since the manual transmission unit is very heavy, 2 people are needed to stand the manual transmission upright as shown in the illustration.



(c) Remove the rear output shaft bearing.

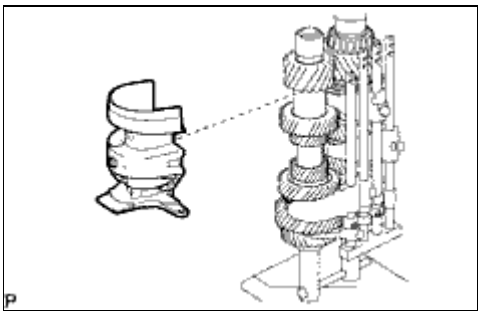


(d) Remove the rear transmission case and intermediate plate.



(e) Remove the intermediate plate from the rear transmission case.

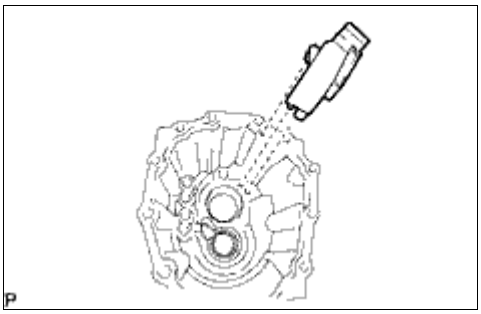
(f) Remove the transmission oil separator sub-assembly (Rear side).



27. REMOVE NO. 3 OIL RECEIVER PIPE

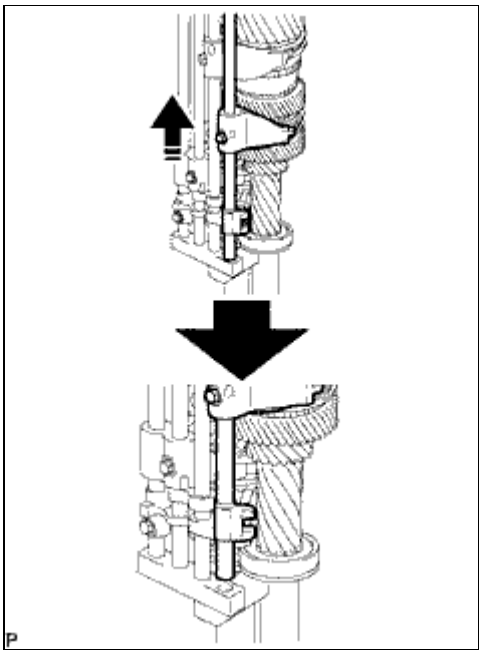
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(a) Remove the No. 3 oil receiver pipe from the rear transmission case.



28. REMOVE SHIFT FORK AND SHIFT FORK SHAFT ASSEMBLY

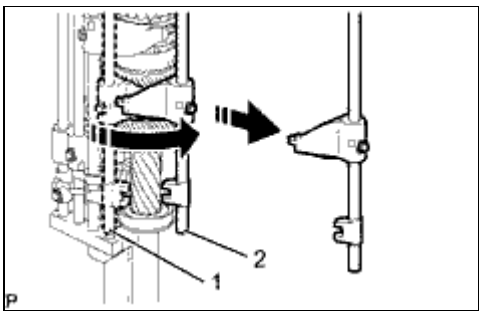
(a) Move the No. 2 hub sleeve as shown in the illustration and remove the No. 3 gear shift fork from SST as shown in the illustration.



Text in Illustration

➡	Remove in this direction

(b) Slide the No. 3 gear shift fork from position 1 to 2 and then remove the No. 3 gear shift fork together with the No. 3 gear shift fork shaft.

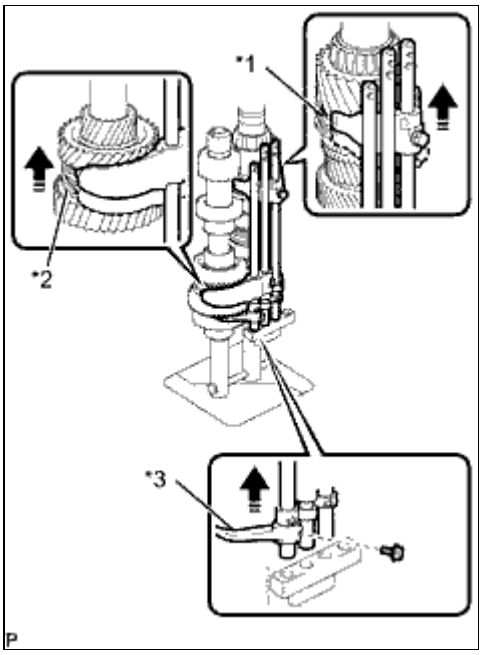


Text in Illustration

➡	Remove in this direction

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(c) Slide the No. 2 and No. 1 hub sleeves as shown in the illustration.

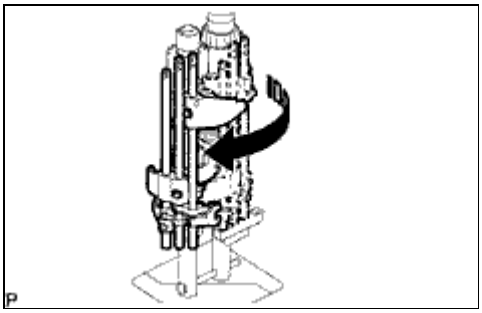


Text in Illustration

*1	No. 2 Transmission Hub Sleeve
*2	No. 1 Transmission Hub Sleeve
*3	No. 4 Transmission Hub Sleeve
➡	Remove in this direction

(d) Remove the bolt from the No. 4 gear shift fork, and then slide the No. 4 gear shift fork shaft as shown in the illustration.

(e) Move the shift fork and shift fork shaft assembly as shown in the illustration.



Text in Illustration

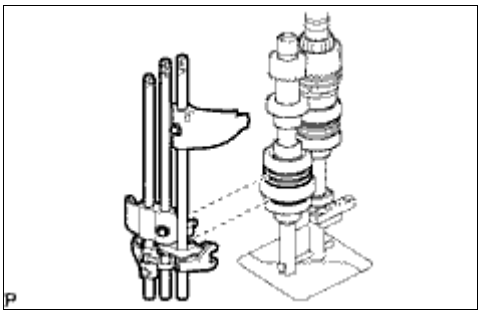
➡	Remove in this direction

NOTICE:

Move the 3 shift fork shafts together.

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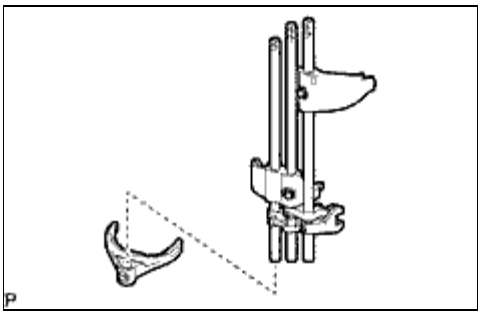
(f) Remove the shift fork and shift fork shaft sub-assembly from the counter gear.



NOTICE:

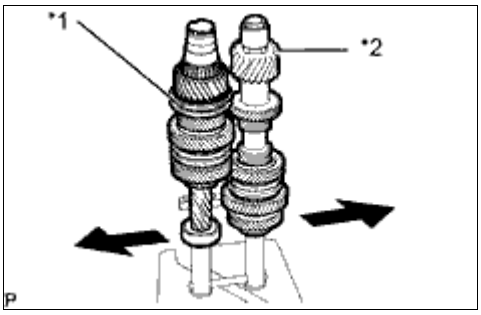
Do not drop the No. 4 gear shift fork.

(g) Remove the No. 4 gear shift fork.



29. REMOVE OUTPUT SHAFT

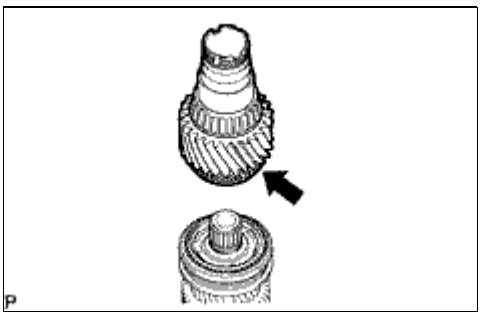
(a) Expand SST to the left and right.



Text in Illustration

*1	Input Shaft
*2	Counter Gear

(b) Remove the output shaft from the transmission unit.

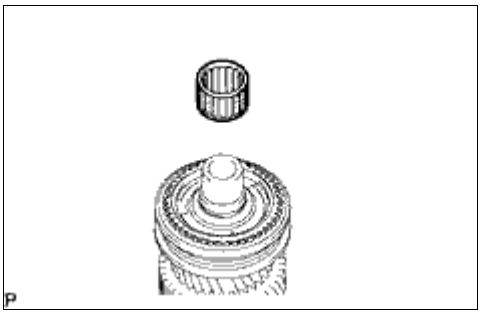


(c) Remove the output shaft spacer and rear output shaft bearing shim.

30. REMOVE INPUT SHAFT BEARING

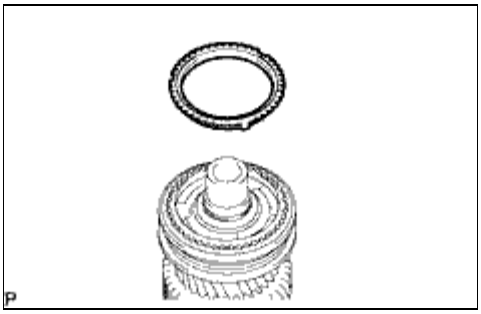
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(a) Remove the input shaft bearing from the input shaft.



31. REMOVE NO. 4 SYNCHRONIZER RING

(a) Remove the No. 4 synchronizer ring from the input shaft.



32. REMOVE INPUT SHAFT

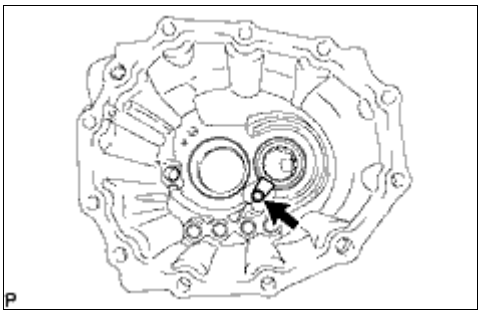
(a) Remove the input shaft from SST.

33. REMOVE COUNTER GEAR

(a) Remove the counter gear from SST.

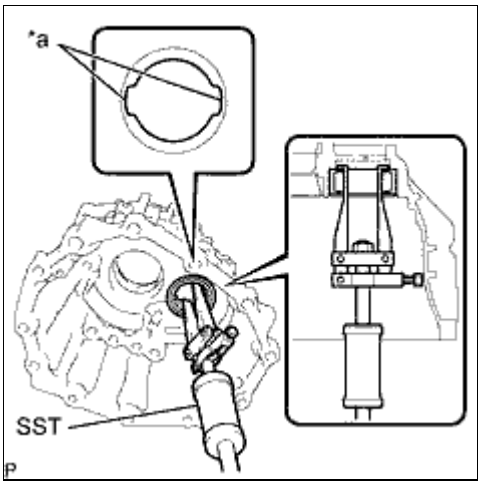
34. REMOVE REAR COUNTER GEAR BEARING OR ROLLER

(a) Remove the bolt and bearing lock plate.



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(b) Using SST, remove the rear counter gear bearing or roller (outer) from the rear transmission case.



Text in Illustration

*a	Groove of the Rear Transmission Case

SST: 09308-00010

NOTICE:

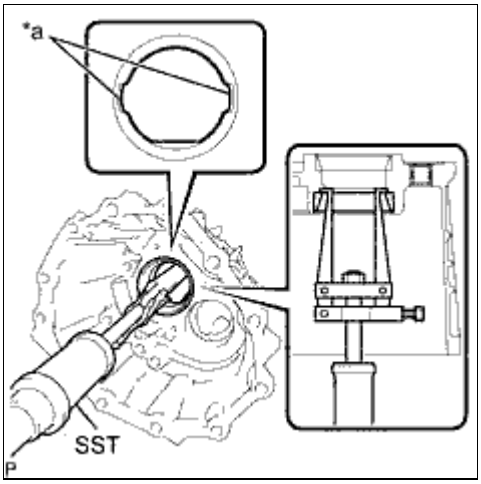
Do not damage the contact surfaces of the rear transmission case.

HINT:

Align the groove of the rear transmission case with the claws of SST.

35. REMOVE FRONT OUTPUT SHAFT BEARING

(a) Using SST, remove the front output shaft bearing (outer race) from the rear transmission case.



Text in Illustration

*a	Groove of the Rear Transmission Case

SST: 09308-00010

NOTICE:

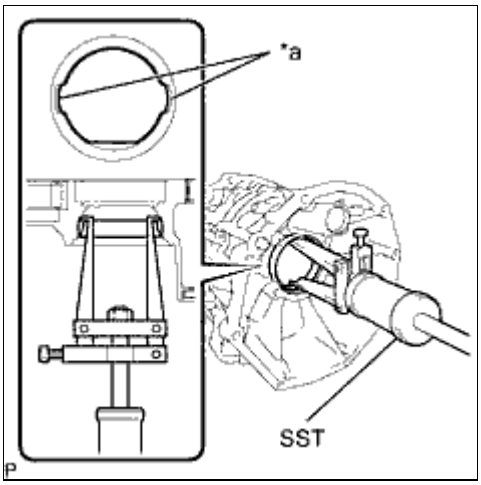
Do not damage the contact surfaces of the rear transmission case.

HINT:

Align the groove of the rear transmission case with the claws of SST.

36. REMOVE REAR OUTPUT SHAFT BEARING

(a) Using SST, remove the rear output shaft bearing (outer) from the rear transmission case.



Text in Illustration

*a	Groove of the Rear Transmission Case

SST: 09308-00010

NOTICE:

Do not damage the contact surfaces of the rear transmission case.

HINT:

Align the groove of the rear transmission case with the claws of SST.

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37. REMOVE SHIFT AND SELECT LEVER SHAFT NEEDLE ROLLER BEARING

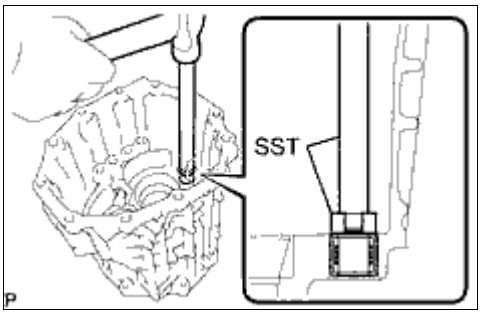
(a) Using SST, remove the shift and select lever shaft needle roller bearing from the rear transmission case.

SST: 09950-60010

09951-00230

SST: 09950-70010

09951-07200



38. REMOVE TRANSMISSION CASE PLUG

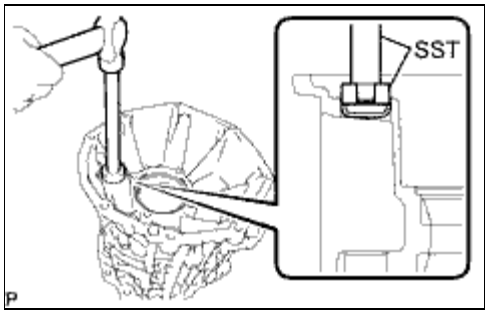
(a) Using SST, remove the transmission case plug from the rear transmission case.

SST: 09950-60010

09951-00230

SST: 09950-70010

09951-07200



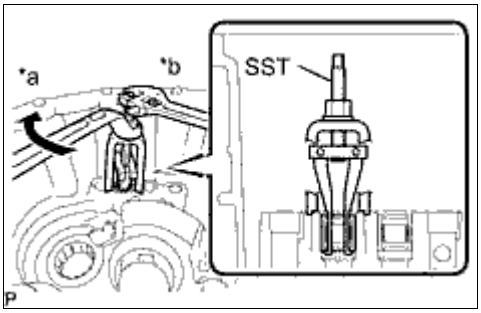
39. REMOVE SHIFT FORK SHAFT BEARING

(a) Using SST, remove the 2 shift fork shaft bearings (rear side) from the rear transmission case.

Text in Illustration

*a	Turn
*b	Hold

SST: 09319-60020



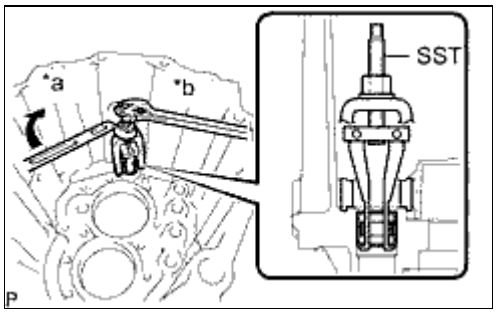
40. REMOVE SHIFT AND SELECT LEVER SHAFT NEEDLE ROLLER BEARING

(a) Using SST, remove the shift and select lever shaft needle roller bearing (front side) from the front transmission case.

Text in Illustration

*a	Turn
*b	Hold

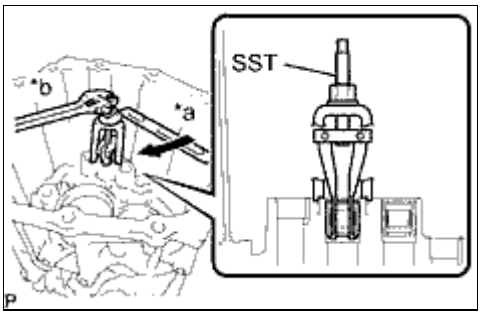
SST: 09319-60020



41. REMOVE SHIFT FORK SHAFT BEARING

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(a) Using SST, remove the 2 shift fork shaft bearings (front side) from the front transmission case.



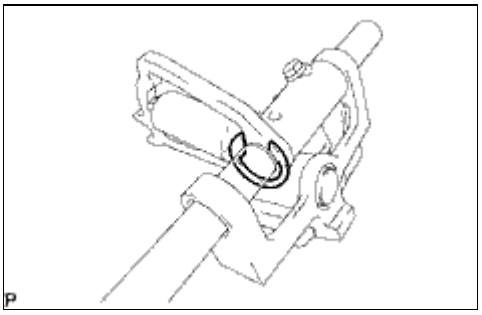
Text in Illustration

*a	Turn
*b	Hold

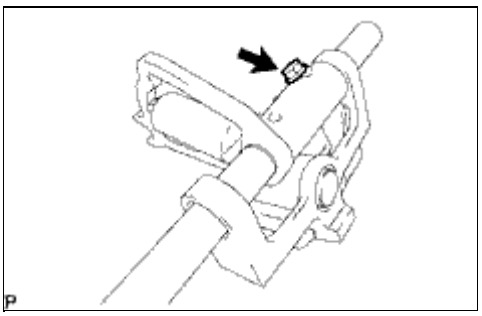
SST: 09319-60020

42. REMOVE SHIFT AND SELECT LEVER SHAFT

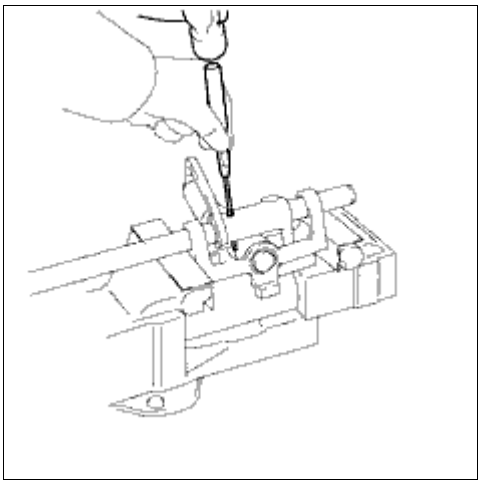
(a) Using a snap ring expander, remove the E-ring from the shift and select lever shaft.



(b) Remove the bolt from the inner select lever.



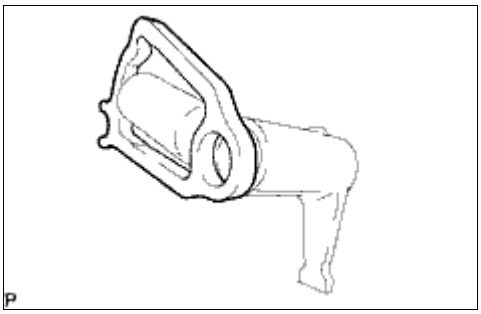
(c) Using a 5 mm pin punch and hammer, tap out the straight pin.



(d) Remove the shift interlock plate sub-assembly and inner select lever (shift and select cam, No. 2 lock ball pin and select return No. 1 compression spring) from the shift and select lever shaft.

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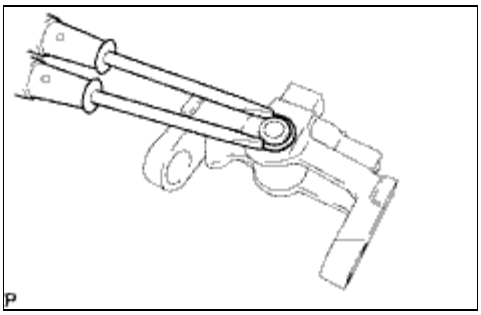
(e) Remove the shift and select cam, No. 2 lack ball pin, select return No. 1 compression spring from the inner select lever.



(f) Using 2 screwdrivers and a hammer, tap off the snap ring.

HINT:

Use a piece of cloth to prevent the snap ring from flying off.



(g) Remove the shift arm pivot and shift arm from the shift interlock plate sub-assembly.

43. REMOVE NEEDLE ROLLER BEARING

(a) Using SST and a press, remove the needle roller bearing from the shift arm.

Text in Illustration

*1	Needle Roller Bearing
*2	Shift Arm

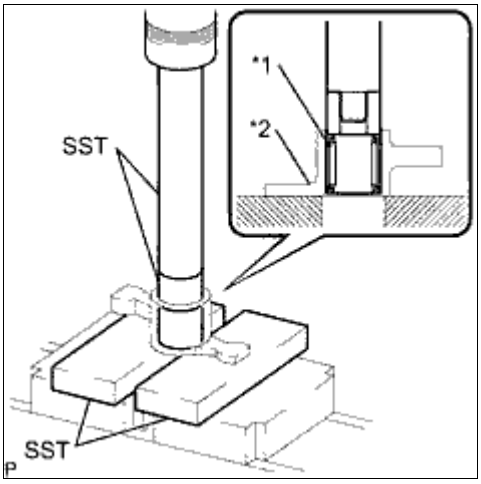
SST: 09527-20011

SST: 09950-60010

09951-00220

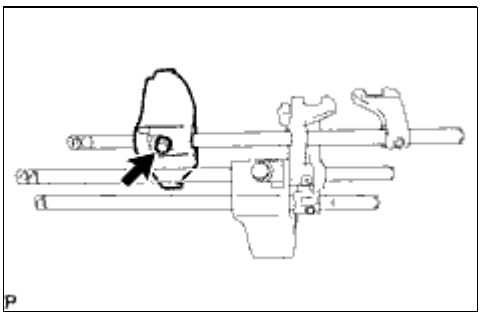
SST: 09950-70010

09951-07100



44. REMOVE NO. 2 GEAR SHIFT FORK SHAFT

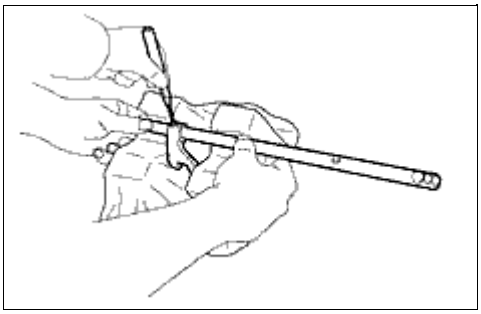
(a) Remove the bolt and No. 2 gear shift fork from the No. 2 gear shift fork shaft.



(b) Remove the No. 2 gear shift fork shaft from the No. 1 gear shift fork head.

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(c) Place a cloth on 2 V-blocks, set the No. 2 gear shift fork shaft on the cloth, and then hold the shaft in place as shown in the illustration.



CAUTION:

- Perform this procedure with 2 people.
- Make sure to protect the gear shift fork shaft with a cloth before performing this procedure. If the gear shift fork shaft is damaged, shifting operations will worsen.
- Firmly secure the gear shift fork shaft.

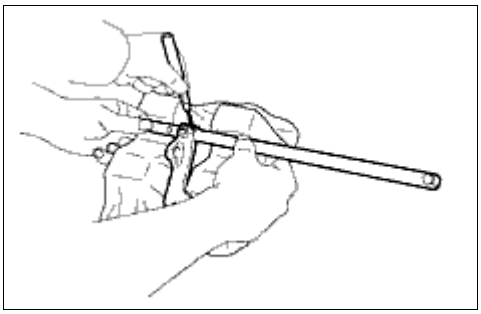
(d) Using a 5 mm pin punch and hammer, tap out the slotted pin.

(e) Remove the No. 2 gear shift head from the No. 2 gear shift fork shaft.

45. REMOVE NO. 4 GEAR SHIFT FORK SHAFT

(a) Remove the No. 4 gear shift fork from the No. 4 gear shift fork shaft.

(b) Place a cloth on 2 V-blocks, set the No. 4 gear shift fork shaft on the cloth, and then hold the shaft in place as shown in the illustration.



CAUTION:

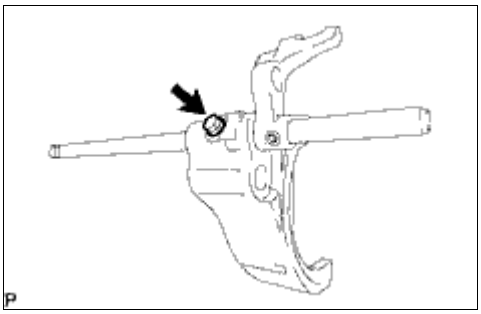
- Perform this procedure with 2 people.
- Make sure to protect the gear shift fork shaft with a cloth before performing this procedure. If the gear shift fork shaft is damaged, shifting operations will worsen.
- Firmly secure the gear shift fork shaft.

(c) Using a 5 mm pin punch and hammer, tap out the slotted pin.

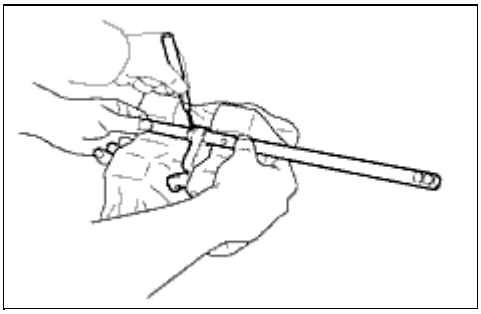
(d) Remove the No. 4 gear shift head from the No. 4 gear shift fork shaft.

46. REMOVE NO. 1 GEAR SHIFT FORK SHAFT

(a) Remove the bolt and No. 1 gear shift fork from the No. 1 gear shift fork shaft.



(b) Place a cloth on 2 V-blocks, set the No. 1 gear shift fork shaft on the cloth, and then hold the shaft in place as shown in the illustration.



CAUTION:

- Perform this procedure with 2 people.
- Make sure to protect the gear shift fork shaft with a cloth before performing this procedure. If the gear shift fork shaft is damaged, shifting operations will worsen.
- Firmly secure the gear shift fork shaft.

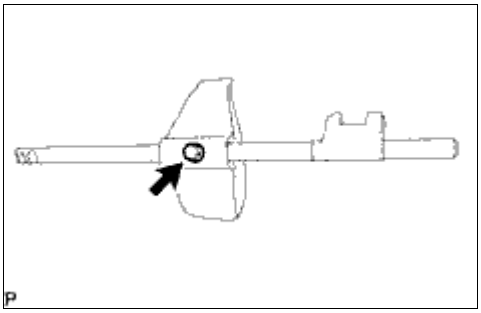
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(c) Using a 5 mm pin punch and hammer, tap out the slotted pin.

(d) Remove the No. 1 gear shift head from the No. 1 gear shift fork shaft.

47. REMOVE NO. 3 GEAR SHIFT FORK SHAFT

(a) Remove the bolt and No. 3 gear shift fork from the No. 3 gear shift fork shaft.



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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000005V05000X
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: INSPECTION; 2016 MY Tacoma [08/2015 -]		

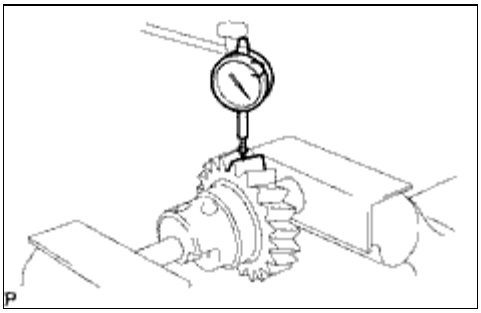
INSPECTION

1. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance:
0.015 to 0.050 mm (0.000591 to 0.00196 in.)
Maximum clearance:
0.050 mm (0.00196 in.)

If the clearance is more than the maximum, replace the needle roller bearing.

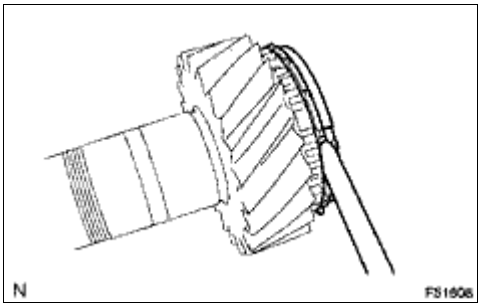


2. INSPECT NO. 4 SYNCHRONIZER RING

(a) Using a feeler gauge, measure the clearance between the No. 4 synchronizer ring and gear spline.

Standard clearance:
0.82 to 1.48 mm (0.0323 to 0.0582 in.)
Maximum clearance:
0.82 mm (0.0323 in.)

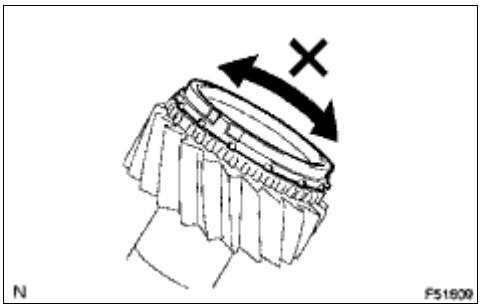
If the clearance is less than the minimum, replace the No. 4 synchronizer ring.



(b) Coat the output shaft cone with gear oil.

(c) Check the braking effect of the synchronizer ring.

(1) Turn the synchronizer ring in both directions while pushing it against the output shaft cone. Check that the ring locks in both directions. If No. 4 synchronizer ring turns, replace it.



3. INSPECT REVERSE IDLER GEAR

(a) Install the reverse idler gear with the reverse idler gear shaft bolt.

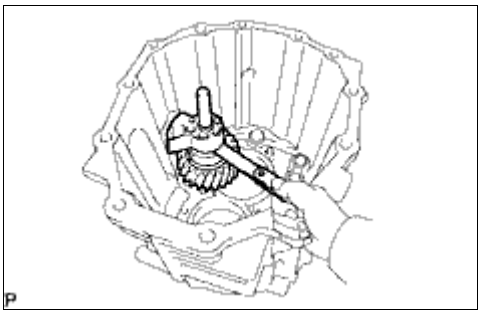
Torque:
25 N·m {255 kgf·cm, 18ft·lbf}

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(b) Using a feeler gauge, measure the thrust clearance.

Standard clearance:
0.196 to 0.939 mm (0.0078 to 0.0369 in.)
Maximum clearance:
0.939 mm (0.0369 in.)

If the clearance is more than the maximum, replace the reverse idler gear shaft, reverse idler gear or transmission case.



(c) Remove the reverse idler gear.

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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000177R00FX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: MANUAL TRANSMISSION UNIT: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

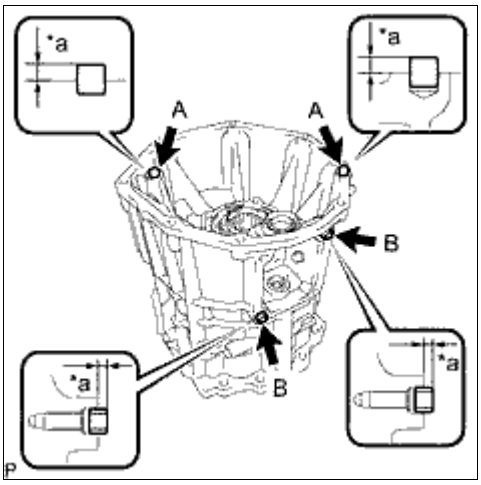
REASSEMBLY

1. INSTALL STRAIGHT PIN AND RING PIN

NOTICE:

It is not necessary to remove a straight pin and ring pin unless it is being replaced.

(a) Using a plastic-faced hammer, tap 2 new straight pins and 2 new ring pins into the rear transmission case.



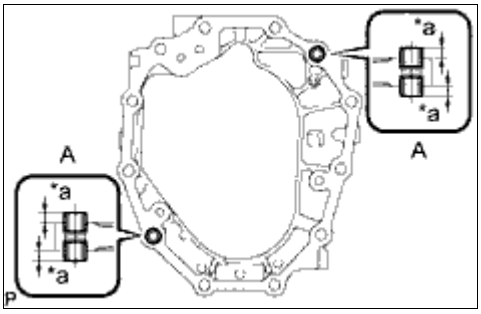
Text in Illustration

*a	Protrusion Height

Specified Condition:

ITEM	SPECIFIED CONDITION
A	5.5 to 6.5 mm (0.2166 to 0.2559 in.)
B	3.5 to 4.5 mm (0.1378 to 0.1771 in.)

(b) Using a plastic-faced hammer, tap 4 new ring pins into the intermediate plate.



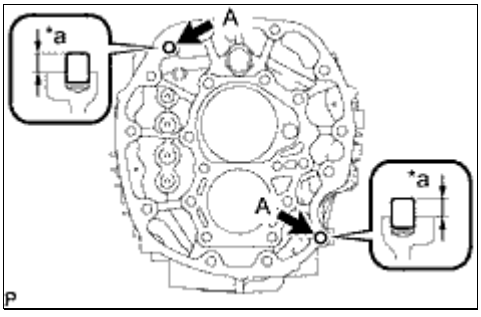
Text in Illustration

*a	Protrusion Height

Specified Condition:

ITEM	SPECIFIED CONDITION
A	5.5 to 7.5 mm (0.2166 to 0.2952 in.)

(c) Using a plastic-faced hammer, tap 2 new straight pins into the front transmission case.



Text in Illustration

*a	Protrusion Height

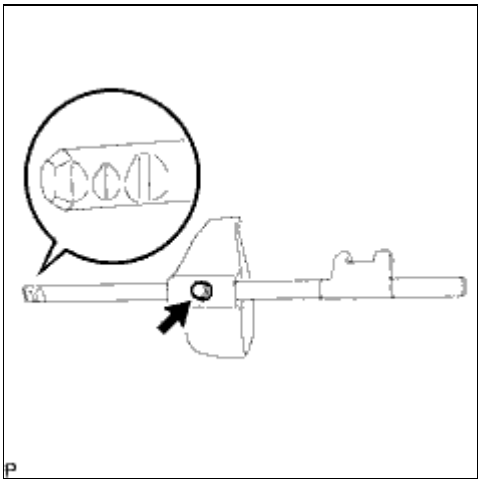
Specified Condition:

ITEM	SPECIFIED CONDITION

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ITEM	SPECIFIED CONDITION
A	9.5 to 10.5 mm (0.3741 to 0.4133 in.)

2. INSTALL NO. 3 GEAR SHIFT FORK SHAFT



(a) Install the No. 3 gear shift fork to the No. 3 gear shift fork shaft with a new bolt.

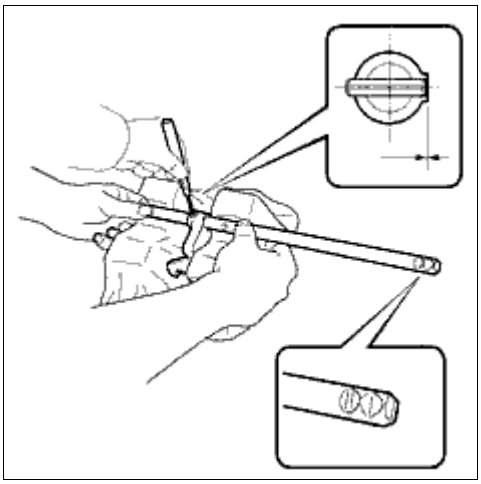
Torque:

20 N·m {199 kgf·cm, 14ft·lbf}

NOTICE:

Secure the shift fork with the bolt from the side as shown in the illustration.

3. INSTALL NO. 1 GEAR SHIFT FORK SHAFT



(a) Pass the No. 1 gear shift fork shaft through the No. 1 gear shift fork head, set the shaft on the cloth that was placed on the 2 V-blocks, and then hold the shaft in place as shown in the illustration.

CAUTION:

- Make sure to perform this procedure with 2 people and firmly hold the gear shift fork shaft in place.
- Make sure to protect the gear shift fork shaft with a cloth before performing this procedure. If the gear shift fork shaft is damaged, shifting operations will worsen.

(b) Using a 5 mm pin punch and hammer, tap a new slotted pin into the No. 1 gear shift head and No. 1 gear shift fork shaft.

Standard depth:

0 to 0.5 mm (0 to 0.0196 in.)

NOTICE:

Secure the gear shift head with the new slotted pin from the side as shown in the illustration.

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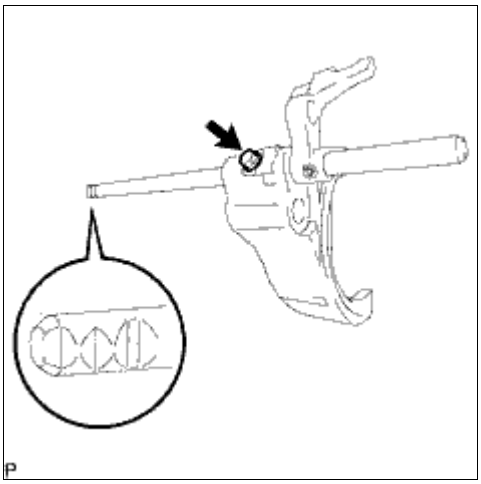
(c) Install the No. 1 gear shift fork to the No. 1 gear shift fork shaft with a new bolt.

Torque:

20 N·m {199 kgf·cm, 14ft·lbf}

NOTICE:

Secure the shift fork with the bolt from the side as shown in the illustration.

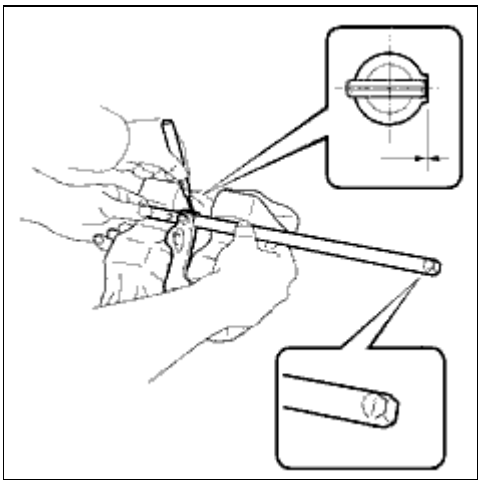


4. INSTALL NO. 4 GEAR SHIFT FORK SHAFT

(a) Pass the No. 4 gear shift fork shaft through the No. 4 gear shift fork head, set the shaft on the cloth that was placed on the 2 V-blocks, and then hold the shaft in place as shown in the illustration.

CAUTION:

- Make sure to perform this procedure with 2 people and firmly hold the gear shift fork shaft in place.
- Make sure to protect the gear shift fork shaft with a cloth before performing this procedure. If the gear shift fork shaft is damaged, shifting operations will worsen.



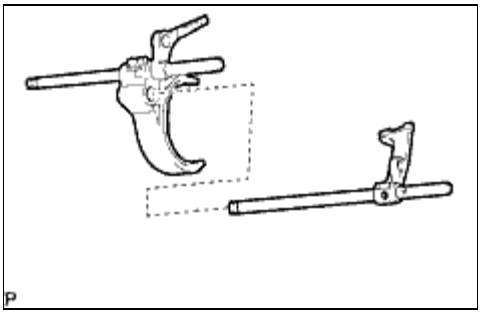
(b) Using a 5 mm pin punch and hammer, tap a new slotted pin into the No. 4 gear shift head and No. 4 gear shift fork shaft.

Standard depth:
0 to 0.5 mm (0 to 0.0196 in.)

NOTICE:

Secure the gear shift head with the new slotted pin from the side as shown in the illustration.

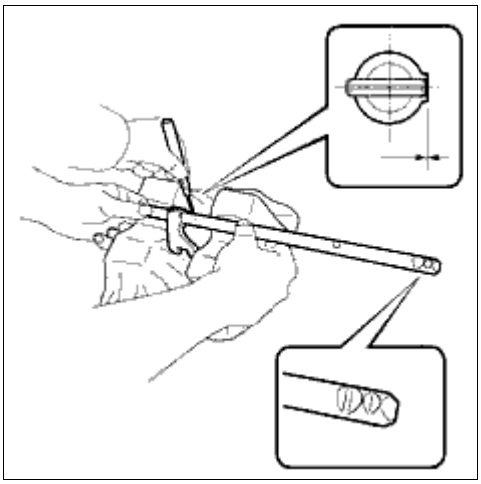
(c) Install the No. 4 gear shift fork shaft to the No. 1 gear shift fork.



5. INSTALL NO. 2 GEAR SHIFT FORK SHAFT

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(a) Pass the No. 2 gear shift fork shaft through the No. 2 gear shift fork head, set the shaft on the cloth that was placed on the 2 V-blocks, and then hold the shaft in place as shown in the illustration.



CAUTION:

- Make sure to perform this procedure with 2 people and firmly hold the gear shift fork shaft in place.
- Make sure to protect the gear shift fork shaft with a cloth before performing this procedure. If the gear shift fork shaft is damaged, shifting operations will worsen.

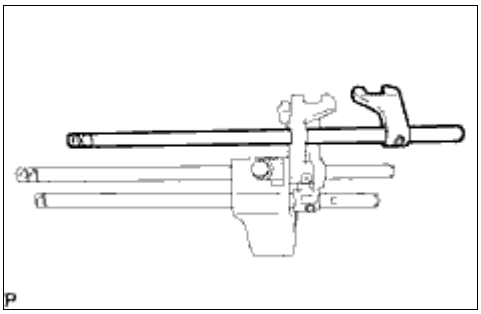
(b) Using a 5 mm pin punch and hammer, tap a new slotted pin into the No. 2 gear shift head and No. 2 gear shift fork shaft.

Standard depth:
0 to 0.5 mm (0 to 0.0196 in.)

NOTICE:

Secure the gear shift head with the new slotted pin from the side as shown in the illustration.

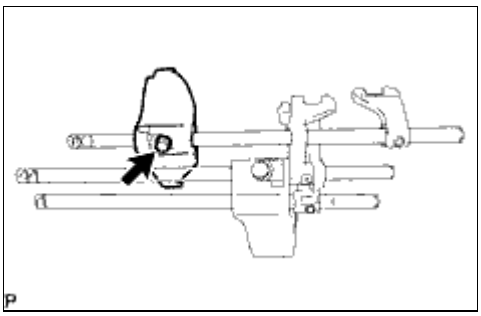
(c) Install the No. 2 gear shift fork shaft to the No. 1 gear shift fork head.



(d) Install the No. 2 gear shift fork to the No. 2 gear shift fork shaft with a new bolt.

Torque:

20 N·m {199 kgf·cm, 14ft·lbf}



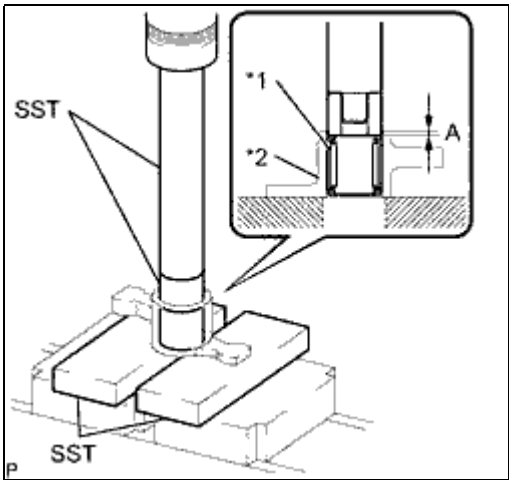
NOTICE:

Secure the shift fork with the bolt from the side as shown in the illustration.

6. INSTALL NEEDLE ROLLER BEARING

(a) Using SST and a press, install a new needle roller bearing into the shift arm so that dimension A in the illustration is as specified.

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Text in Illustration

*1	Needle Roller Bearing
*2	Shift Arm

SST: 09527-20011

SST: 09950-60010

09951-00220

SST: 09950-70010

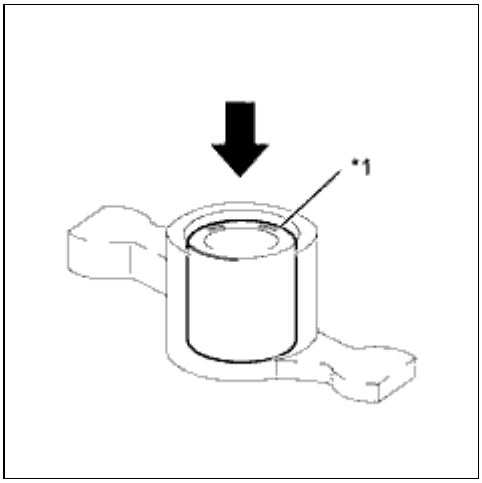
09951-07100

Dimension A:

0.5 to 1.5 mm (0.0197 to 0.0591 in.)

NOTICE:

Press the engraved surface to install the bearing.



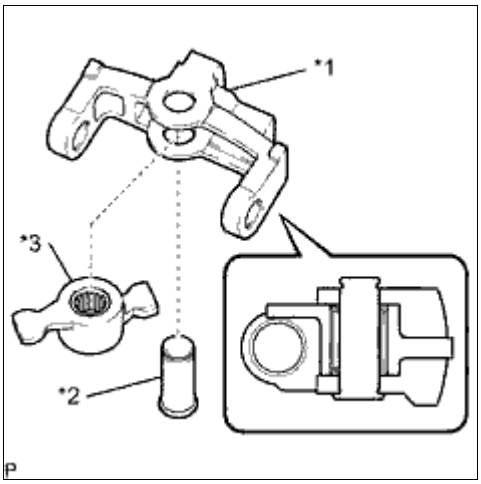
Text in Illustration

*1	Engraved Surface
➡	Press

7. INSTALL SHIFT INTERLOCK PLATE SUB-ASSEMBLY

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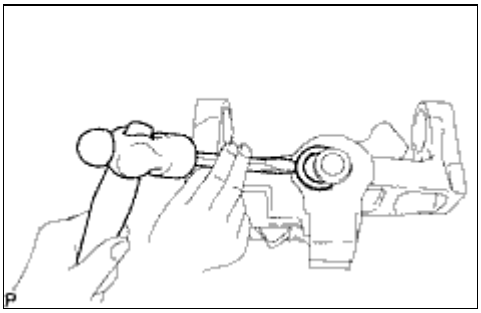
(a) Coat the shift fork shaft bearing with gear oil, and then install the shift arm and shift arm pivot to the shift interlock plate sub-assembly.



Text in Illustration

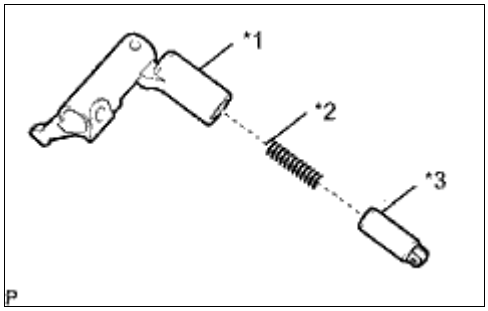
*1	Shift Interlock Plate Sub-assembly
*2	Shift Arm Pivot
*3	Shift Arm

(b) Install a new snap ring to the shift arm pivot.



8. INSTALL SHIFT AND SELECT LEVER SHAFT

(a) Coat the No. 2 lock ball pin with the gear oil.

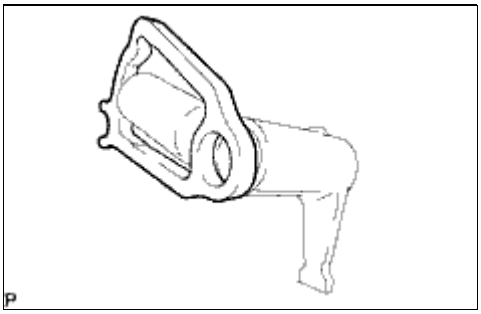


Text in Illustration

*1	Inner Select Lever
*2	Select Return Compression Spring
*3	No. 2 Lock Ball Pin

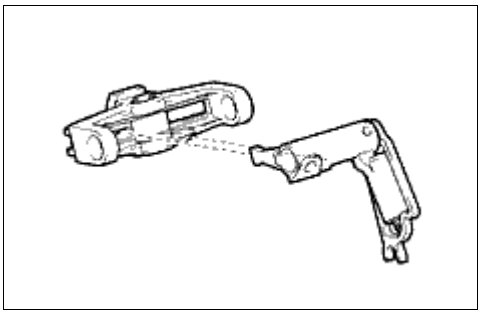
(b) Install the No. 2 lock ball pin and select return compression spring to the inner select lever.

(c) Install the shift and select cam to the inner select lever.

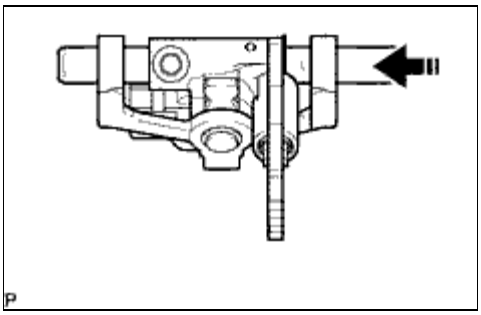


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(d) Align the inner select lever with the shift interlock plate sub-assembly, and then insert the inner select lever.



(e) Install the shift and select shaft to the shift interlock plate and inner select lever.



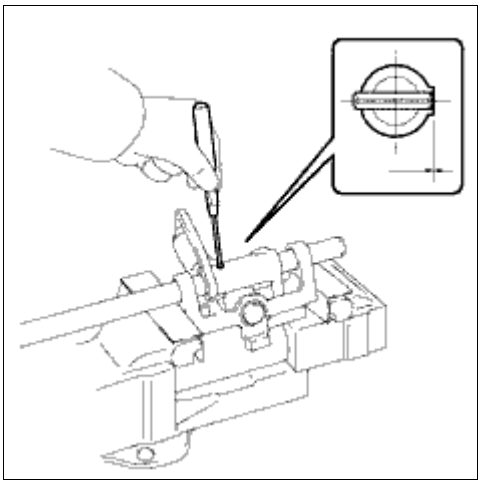
(f) Using a 5 mm pin punch and hammer, tap a new slotted pin into the inner select lever and shift and select lever shaft.

Standard Depth:

0 to 0.5 mm (0 to 0.0196 in.)

NOTICE:

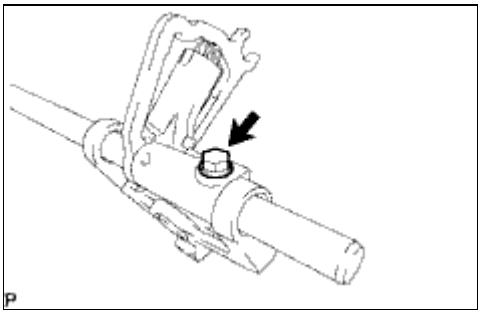
Face the shaft groove towards the shift and select cam, and then tap in the pin as shown in the illustration.



(g) Install a new bolt.

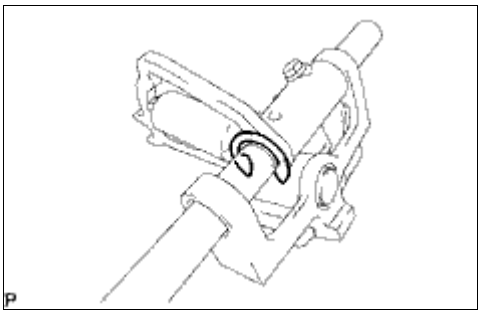
Torque:

50 N·m {511 kgf·cm, 37ft·lbf}



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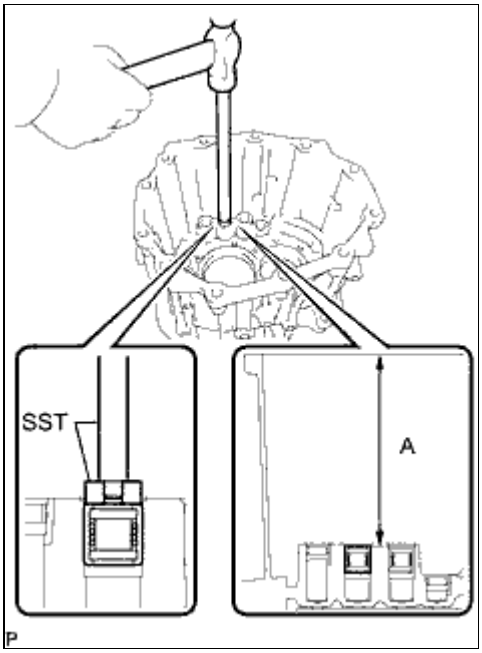
(h) Install a new E-ring to the shift and select lever shaft.



(i) Check that shaft operates smoothly.

9. INSTALL SHIFT FORK SHAFT BEARING

(a) Using SST and a hammer, tap 2 new shift fork shaft bearings (front side) into the front transmission case so that dimension A in the illustration is as specified.



SST: 09950-60010

09951-00180

SST: 09950-70010

09951-07360

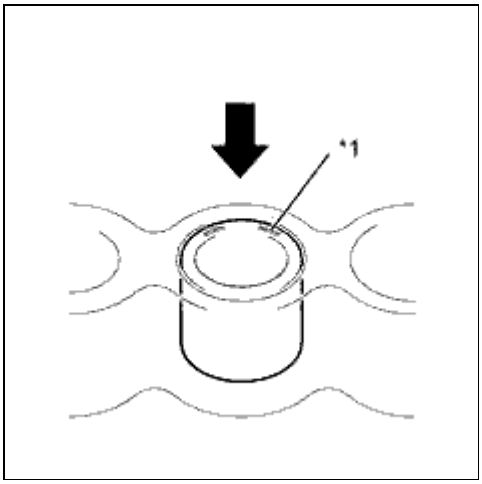
Dimension A:

147.7 to 148.7 mm (5.815 to 5.854 in.)

NOTICE:

Press the engraved surface to install the bearing.

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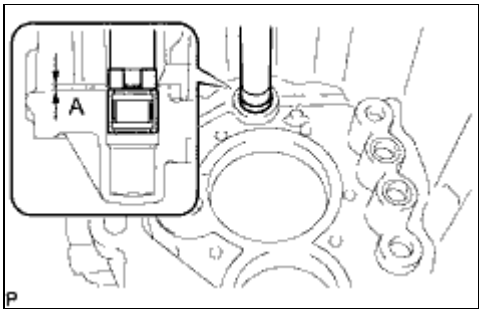


Text in Illustration

*1	Engraved Surface
➡	Press

10. INSTALL SHIFT AND SELECT LEVER SHAFT NEEDLE ROLLER BEARING

(a) Using SST and a hammer, tap a new shift and select lever shaft needle roller bearing (front side) into the front transmission case so that dimension A in the illustration is as specified.



SST: 09950-60010

09951-00230

SST: 09950-70010

09951-07360

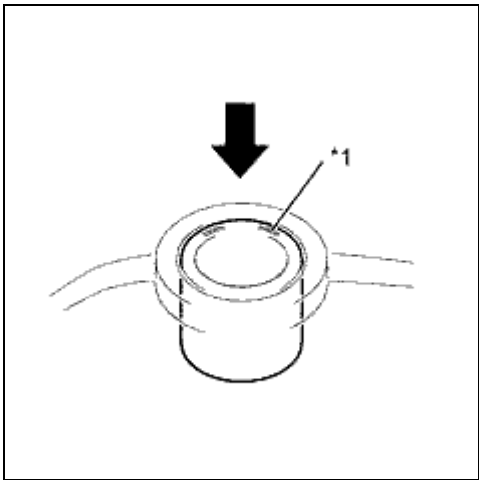
Dimension A:

0.5 to 1.5 mm (0.0197 to 0.0590 in.)

NOTICE:

Press the engraved surface to install the bearing.

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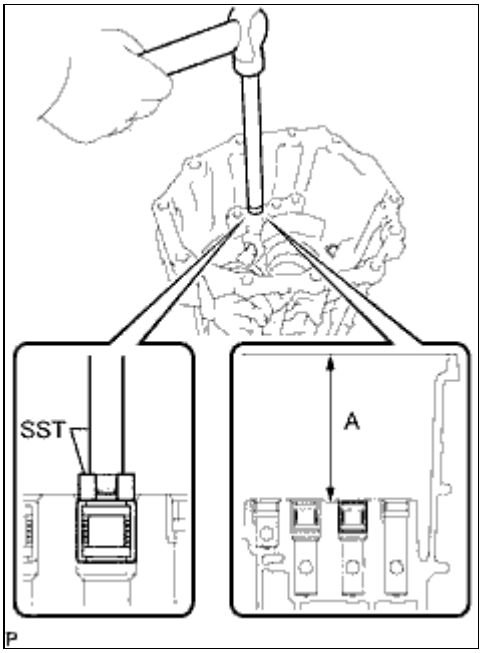


Text in Illustration

*1	Engraved Surface
➡	Press

11. INSTALL SHIFT FORK SHAFT BEARING

(a) Using SST and a hammer, tap 2 new shift fork shaft bearings (rear side) into the rear transmission case so that dimension A in the illustration is as specified.



SST: 09950-60010

09951-00180

SST: 09950-70010

09951-07360

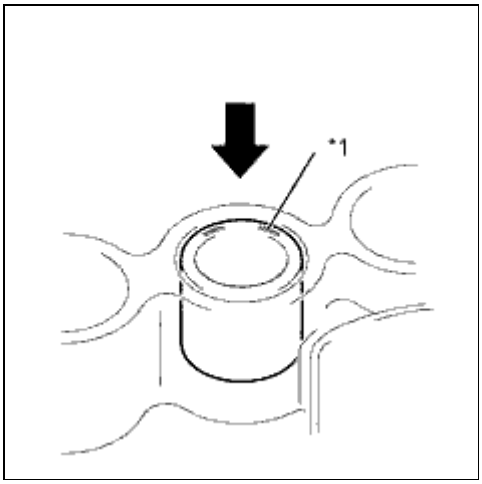
Dimension A:

106.9 to 107.9 mm (4.209 to 4.248 in.)

NOTICE:

Press the engraved surface to install the bearing.

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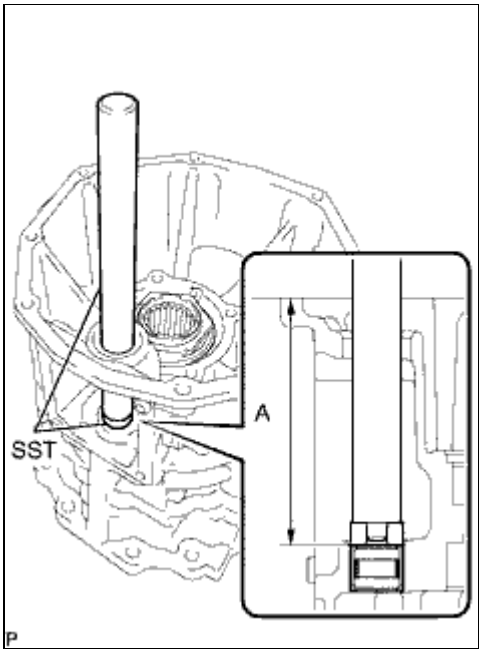


Text in Illustration

*1	Engraved Surface
➡	Press

12. INSTALL SHIFT AND SELECT LEVER SHAFT NEEDLE ROLLER BEARING

(a) Using SST and a hammer, tap a new shift and select lever shaft needle roller bearing (rear side) into the rear transmission case so that dimension A in the illustration is as specified.



SST: 09950-60010

09951-00230

SST: 09950-70010

09951-07200

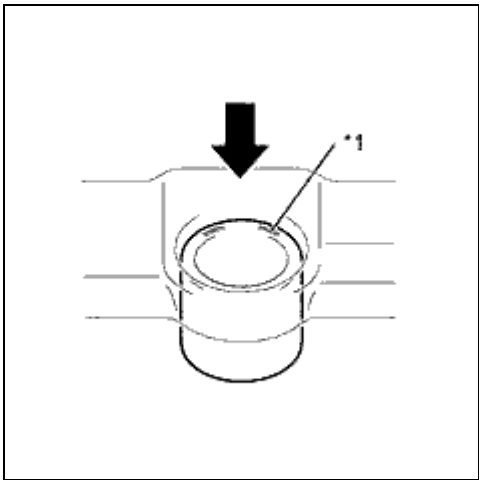
Dimension A:

107.15 to 108.15 mm (4.219 to 4.257 in.)

NOTICE:

Press the engraved surface to install the bearing.

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Text in Illustration

*1	Engraved Surface
➡	Press

13. INSTALL TRANSMISSION CASE PLUG

(a) Using SST and a hammer, tap a new transmission case plug into the rear transmission case so that dimension A in the illustration is as specified.

SST: 09950-60010

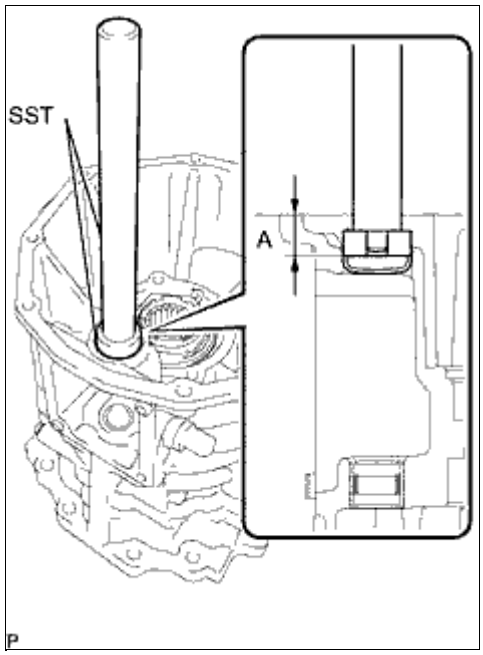
09951-00230

SST: 09950-70010

09951-07200

Dimension A:

17.3 to 18.3 mm (0.6812 to 0.7204 in.)



14. INSTALL REAR COUNTER GEAR BEARING OR ROLLER

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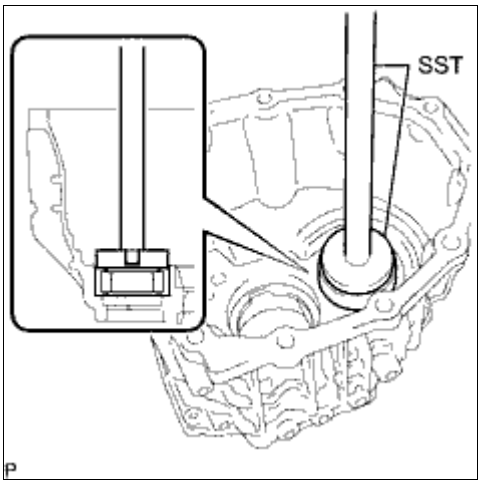
(a) Coat a new rear counter gear bearing or roller (outer race) with gear oil, and then using SST and a press, install it to the rear transmission case.

SST: 09950-60010

09951-00710

SST: 09950-70010

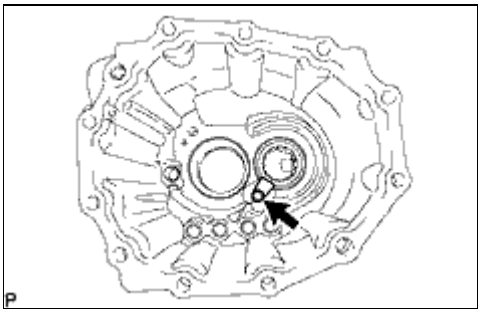
09951-07360



(b) Install the bolt and bearing lock plate.

Torque:

11 N·m {115 kgf·cm, 8ft·lbf}



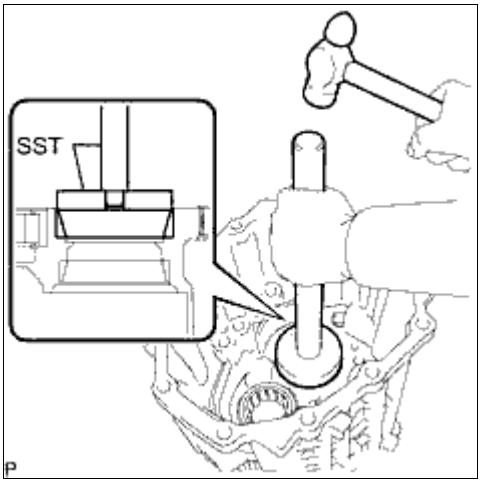
15. INSTALL FRONT OUTPUT SHAFT BEARING

(a) Using SST and a hammer, install a new tapered front output shaft bearing (outer race) to the rear transmission case.

SST: 09950-70010

09951-07200

SST: 09951-00850



16. INSTALL REAR OUTPUT SHAFT BEARING

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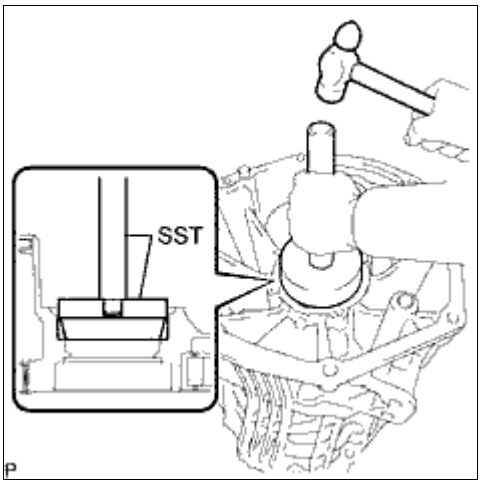
(a) Using SST and a hammer, install a new rear output shaft bearing (outer race) to the rear transmission case.

SST: 09950-60020

09951-00790

SST: 09950-70010

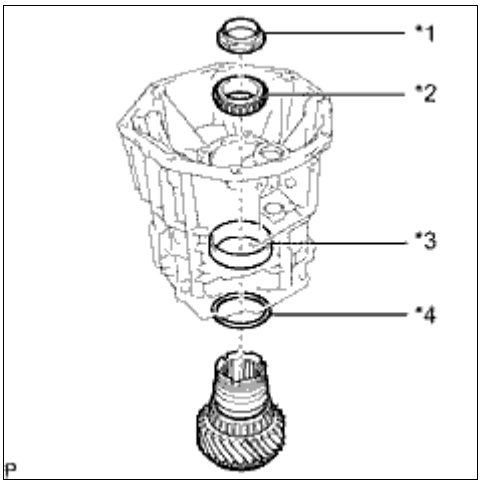
09951-07100



17. INSTALL FRONT OUTPUT SHAFT BEARING INFO

18. INSPECT PRELOAD

(a) Temporarily install the output shaft, rear output shaft bearing shim, output shaft spacer, rear output shaft bearing and a new manual transmission output shaft rear set nut to the rear transmission case.



Text in Illustration

*1	Manual Transmission Output Shaft Rear Set Nut
*2	Rear Output Shaft Bearing
*3	Output Shaft Spacer
*4	Rear Output Shaft Bearing Shim

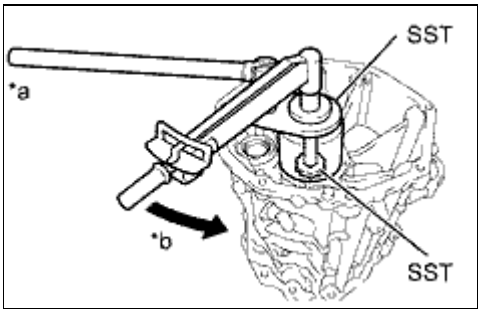
NOTICE:

- Do not apply gear oil to a new output shaft bearing and rear output shaft bearing. If applied, the turning torque cannot be accurately measured.
- If the turning torque is not properly measured, the output shaft bearing may generate abnormal noise and become damaged.

(b) Temporarily install the manual transmission output shaft rear set nut to the output shaft.

Text in Illustration

*a	Hold
*b	Turn



SST: 09326-71010

SST: 09326-71030

Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

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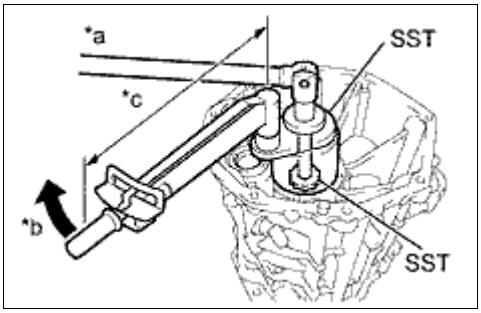
NOTICE:

If the nut is not temporarily installed, the position of the rear output shaft bearing will be unstable causing the preload to be unstable.

(c) Using SST and a torque wrench, tighten the manual transmission output shaft rear set nut.

Text in Illustration

*a	Hold
*b	Turn
*c	Fulcrum Length



SST: 09326-71010

SST: 09326-71030

Torque:

Specified tightening torque -

187 N·m {1907 kgf·cm, 138ft·lbf}

HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- When using SST (fulcrum length of 50 mm (1.9685 in.)) + torque wrench (fulcrum length of 1055 mm (41.5354 in.)): 179 N*m (1820 kgf*cm, 132 ft.*lbf)

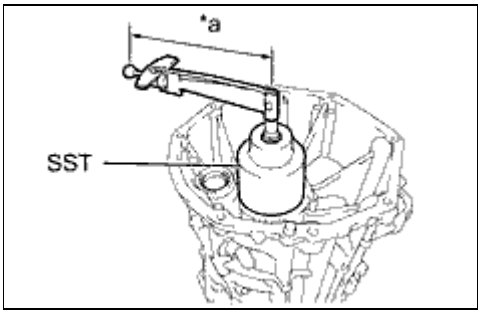
(d) Using SST and a torque wrench, measure the turning torque of the output shaft bearing while rotating SST at 60 rpm.

Text in Illustration

*a	Fulcrum Length

Standard turning torque at 60 rpm:

New output shaft bearing 0.21 to 1.32 N*m (2.14 to 13.46 kgf*cm, 1.86 to 11.68 in.*lbf)



NOTICE:

- Do not apply gear oil to a new output shaft bearing and rear output shaft bearing. If applied, the turning torque cannot be accurately measured.
- If the turning torque is not properly measured, the output shaft bearing may generate abnormal noise and become damaged.

HINT:

- Calculate the torque wrench reading when changing the fulcrum length of the torque wrench INFO .
- New output shaft bearing:

When using SST (fulcrum length of 50 mm (1.969 in.)) + torque wrench (fulcrum length of 160 mm (6.299 in.)): 0.16 to 1.00 N*m (1.64 to 10.19 kgf*cm, 1.42 to 8.85

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in.*lbf)

If the torque is more than the standard, replace the output shaft shim.

HINT:

New output shaft bearing:

When the thickness of the shim is increased by 0.016 mm (0.0006 in.), the preload is reduced by 0.45 N*m (4.59 kgf*cm, 3.98 in.*lbf).

Standard Shim Thickness:

PART NO.	MARK	THICKNESS	PART NO.	MARK	THICKNESS
90564-T0020	01	2.214 to 2.230 mm (0.0872 to 0.0877 in.)	90564-T0044	25	2.598 to 2.614 mm (0.1023 to 0.1029 in.)
90564-T0021	02	2.230 to 2.246 mm (0.0878 to 0.0884 in.)	90564-T0045	26	2.614 to 2.630 mm (0.1030 to 0.1035 in.)
90564-T0022	03	2.246 to 2.262 mm (0.0885 to 0.0890 in.)	90564-T0046	27	2.630 to 2.646 mm (0.1036 to 0.1041 in.)
90564-T0023	04	2.262 to 2.278 mm (0.0891 to 0.0896 in.)	90564-T0047	28	2.646 to 2.662 mm (0.1042 to 0.1048 in.)
90564-T0024	05	2.278 to 2.294 mm (0.0897 to 0.0903 in.)	90564-T0048	29	2.662 to 2.678 mm (0.1049 to 0.1054 in.)
90564-T0025	06	2.294 to 2.310 mm (0.0904 to 0.0909 in.)	90564-T0049	30	2.678 to 2.694 mm (0.1055 to 0.1060 in.)
90564-T0026	07	2.310 to 2.326 mm (0.0910 to 0.0915 in.)	90564-T0050	31	2.694 to 2.710 mm (0.1061 to 0.1066 in.)
90564-T0027	08	2.326 to 2.342 mm (0.0916 to 0.0922 in.)	90564-T0051	32	2.710 to 2.726 mm (0.1067 to 0.1073 in.)
90564-T0028	09	2.342 to 2.358 mm (0.0923 to	90564-T0052	33	2.726 to 2.742 mm (0.1074 to

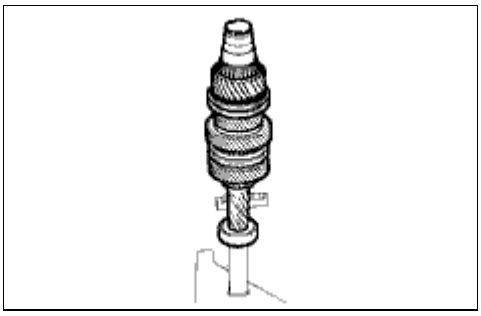
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PART NO.	MARK	THICKNESS	PART NO.	MARK	THICKNESS
		0.0928 in.)			0.1079 in.)
90564-T0029	10	2.358 to 2.374 mm (0.0929 to 0.0934 in.)	90564-T0053	34	2.742 to 2.758 mm (0.1080 to 0.1085 in.)
90564-T0030	11	2.374 to 2.390 mm (0.0935 to 0.0940 in.)	90564-T0054	35	2.758 to 2.774 mm (0.1086 to 0.1092 in.)
90564-T0031	12	2.390 to 2.406 mm (0.0941 to 0.0947 in.)	90564-T0055	36	2.774 to 2.790 mm (0.1093 to 0.1098 in.)
90564-T0032	13	2.406 to 2.422 mm (0.0948 to 0.0953 in.)	90564-T0056	37	2.790 to 2.806 mm (0.1099 to 0.1104 in.)
90564-T0033	14	2.422 to 2.438 mm (0.0954 to 0.0959 in.)	90564-T0057	38	2.806 to 2.822 mm (0.1105 to 0.1111 in.)
90564-T0034	15	2.438 to 2.454 mm (0.0960 to 0.0966 in.)	90564-T0058	39	2.822 to 2.838 mm (0.1112 to 0.1117 in.)
90564-T0035	16	2.454 to 2.470 mm (0.0967 to 0.0972 in.)	90564-T0059	40	2.838 to 2.854 mm (0.1118 to 0.1123 in.)
90564-T0036	17	2.470 to 2.486 mm (0.0973 to 0.0978 in.)	90564-T0060	41	2.854 to 2.870 mm (0.1124 to 0.1129 in.)
90564-T0037	18	2.486 to 2.502 mm (0.0979 to 0.0985 in.)	90564-T0061	42	2.870 to 2.886 mm (0.1130 to 0.1136 in.)
90564-T0038	19	2.502 to 2.518 mm (0.0986 to 0.0991 in.)	90564-T0062	43	2.886 to 2.902 mm (0.1137 to 0.1142 in.)
90564-T0039	20	2.518 to 2.534 mm (0.0992 to 0.0997 in.)	90564-T0063	44	2.902 to 2.918 mm (0.1143 to 0.1148 in.)

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PART NO.	MARK	THICKNESS	PART NO.	MARK	THICKNESS
90564-T0040	21	2.534 to 2.550 mm (0.0998 to 0.1003 in.)	90564-T0064	45	2.918 to 2.934 mm (0.1149 to 0.1155 in.)
90564-T0041	22	2.550 to 2.566 mm (0.1004 to 0.1010 in.)	90564-T0065	46	2.934 to 2.950 mm (0.1156 to 0.1161 in.)
90564-T0042	23	2.566 to 2.582 mm (0.1011 to 0.1016 in.)	90564-T0066	47	2.950 to 2.966 mm (0.1162 to 0.1167 in.)
90564-T0043	24	2.582 to 2.598 mm (0.1017 to 0.1022 in.)	-	-	-

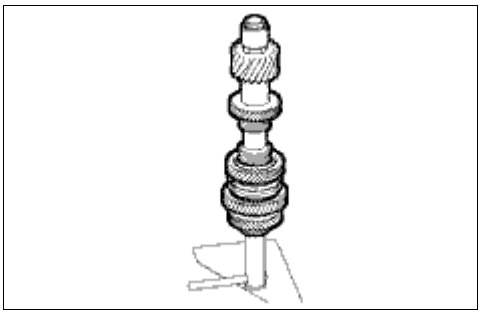
19. INSTALL COUNTER GEAR



(a) Install the counter gear to SST.

SST: 09310-71010

20. INSTALL INPUT SHAFT



(a) Install the input shaft to SST.

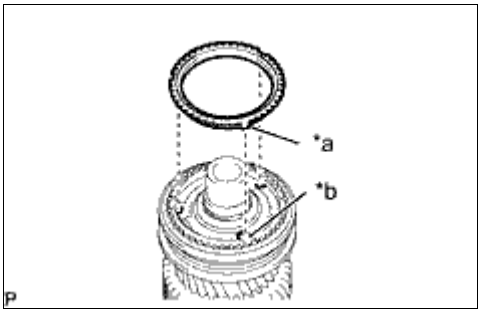
SST: 09310-71010

21. INSTALL NO. 4 SYNCHRONIZER RING

(a) Coat the No. 4 synchronizer ring with the gear oil.

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(b) Install the No. 4 synchronizer ring to the transmission unit.



Text in Illustration

*a	Protrusion
*b	Groove

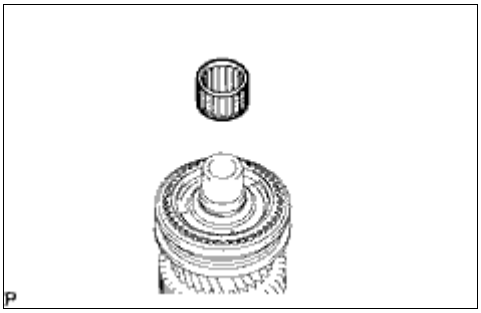
HINT:

Align the protrusion of the No. 4 synchronizer ring with the groove of the No. 2 transmission clutch hub.

22. INSTALL INPUT SHAFT BEARING

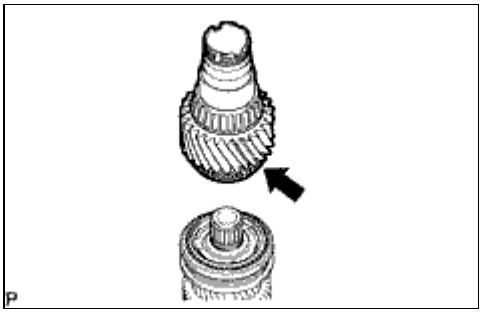
(a) Coat the input shaft bearing with the gear oil.

(b) Install the input shaft bearing to the transmission unit.



23. INSTALL OUTPUT SHAFT

(a) Coat the output shaft with the gear oil as shown in the illustration.



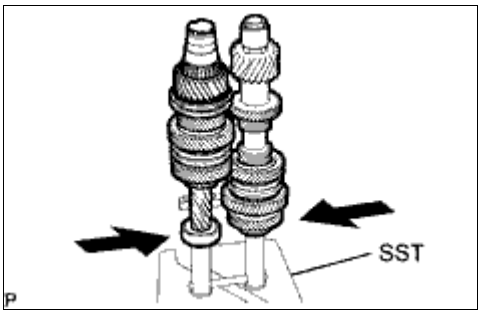
Text in Illustration

➡	Gear Oil

(b) Install the output shaft to the transmission unit.

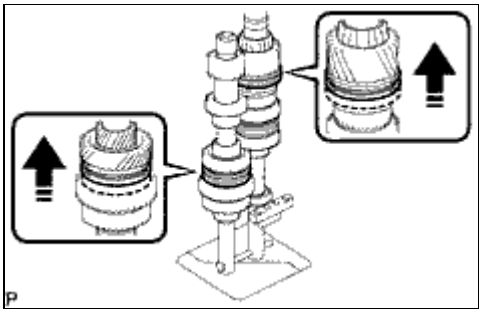
cardiagn.com

(c) Contract SST and connect the input shaft to the counter gear.



24. INSTALL SHIFT FORK AND SHIFT FORK SHAFT ASSEMBLY

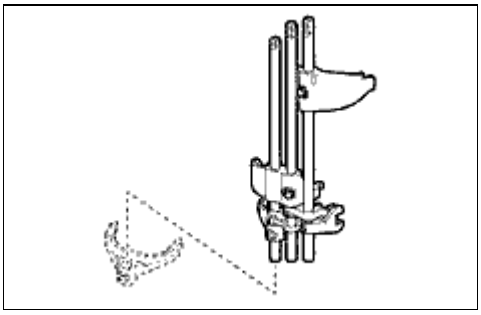
(a) Move the 2 sleeves shown in the illustration in the direction indicated by the arrows.



Text in Illustration

➡	Install in this direction

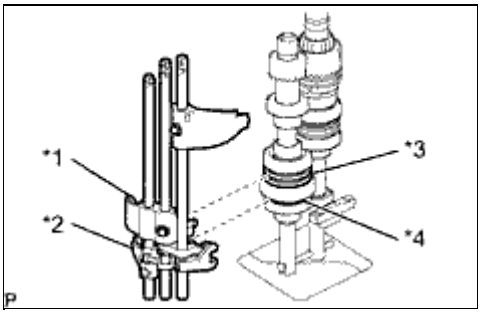
(b) Temporarily install the No. 4 gear shift fork to the No. 4 gear shift fork shaft.



(c) Set the No. 1 gear shift fork onto the No. 1 transmission hub sleeve, and the No. 4 gear shift fork onto the No. 4 transmission hub sleeve.

Text in Illustration

*1	No. 1 Gear Shift Fork
*2	No. 4 Gear Shift Fork
*3	No. 1 Transmission Hub Sleeve
*4	No. 4 Transmission Hub Sleeve

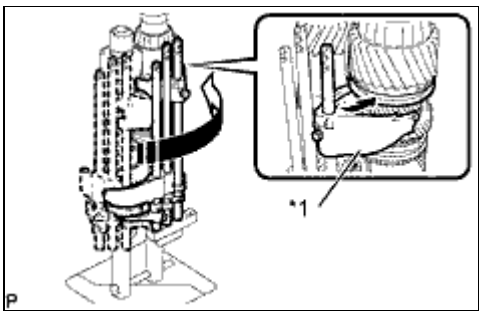


NOTICE:

Do not drop the No. 4 gear shift fork.

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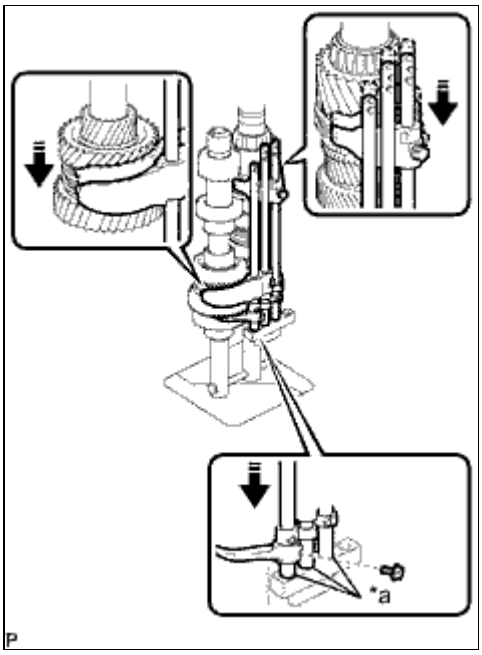
(d) Move the part as shown in the illustration and set the No. 2 gear shift fork onto the No. 2 transmission hub sleeve.



Text in Illustration

*1	No. 2 Gear Shift Fork
➡	Install in this direction

(e) Install the shift fork shaft to the depression of SST.



Text in Illustration

*a	Depressions of SST
➡	Install in this direction

(f) Install the No. 4 gear shift fork to the No. 4 gear shift fork shaft with a new bolt.

Torque:

20 N·m {199 kgf·cm, 14ft·lbf}

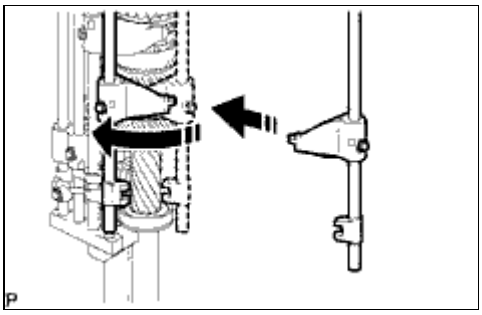
NOTICE:

Securely install the No. 4 gear shift fork with a new bolt from the side of the shaft as shown in the illustration.

(g) Install the No. 3 gear shift fork to the No. 3 transmission hub sleeve, and then move it as shown in the

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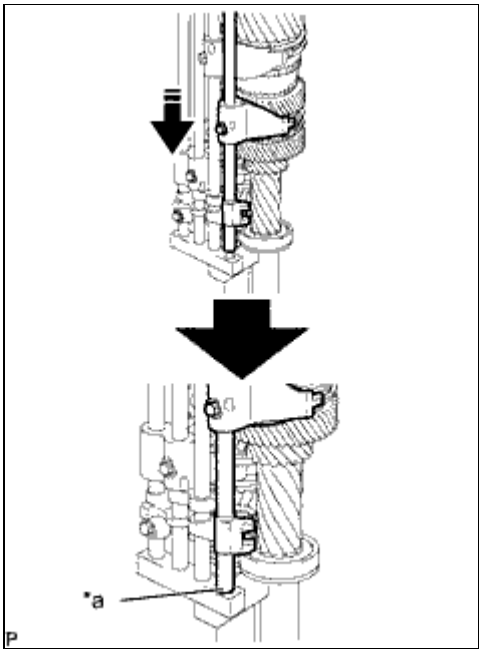
illustration.



Text in Illustration

➡	Install in this direction

(h) Install the shift fork shaft to the depression of SST.

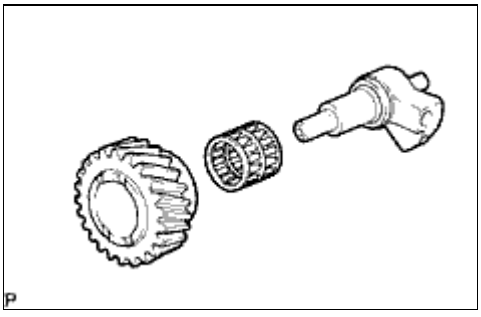


Text in Illustration

*a	Depressions of SST
➡	Install in this direction

25. INSTALL REVERSE IDLER GEAR

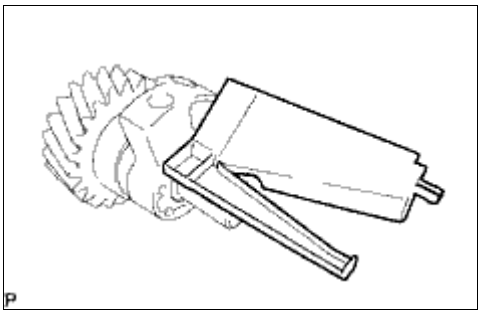
(a) Coat the reverse idler gear with the gear oil.



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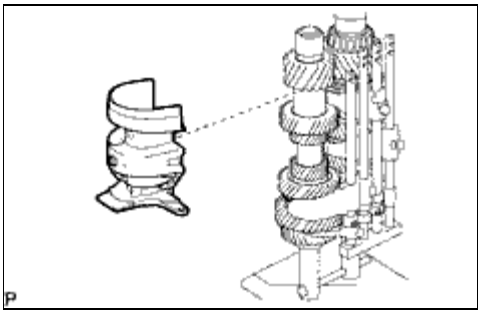
(b) Install the reverse idler gear and reverse idler gear bearing to the reverse idler gear shaft.

(c) Install the No. 2 oil receiver pipe to the reverse idler gear shaft.

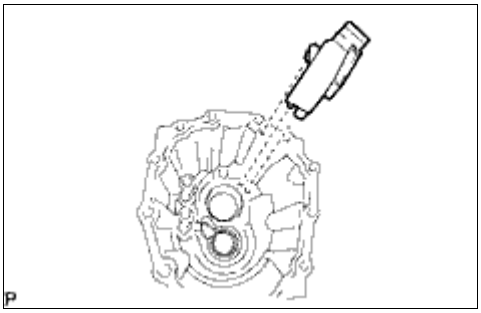


26. INSTALL MANUAL TRANSMISSION CASE SUB-ASSEMBLY

(a) Install the manual transmission oil separator sub-assembly (rear side) to the transmission unit.



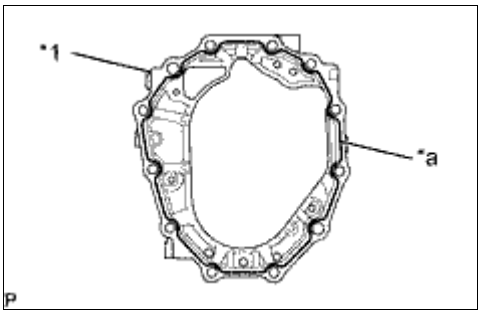
(b) Install the No. 3 oil receiver pipe to the rear transmission case.



(c) Apply seal packing to the transmission intermediate plate shown in the illustration.

Text in Illustration

*1	Transmission Intermediate Plate
*a	Seal Packing



Seal Packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

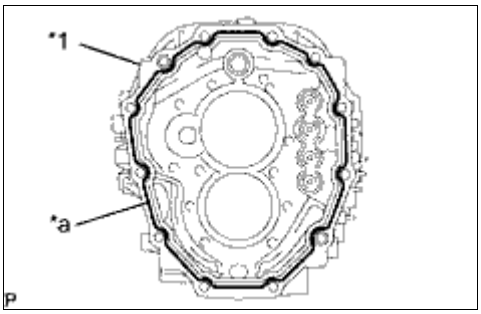
Parts must be assembled within 10 minutes of application. Otherwise, the seal packing (FIPG material) must be removed and reapplied.

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(d) Apply seal packing to the manual transmission case sub-assembly shown in the illustration.

Text in Illustration

*1	Manual Transmission Case Sub-assembly
*a	Seal Packing



Seal Packing:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

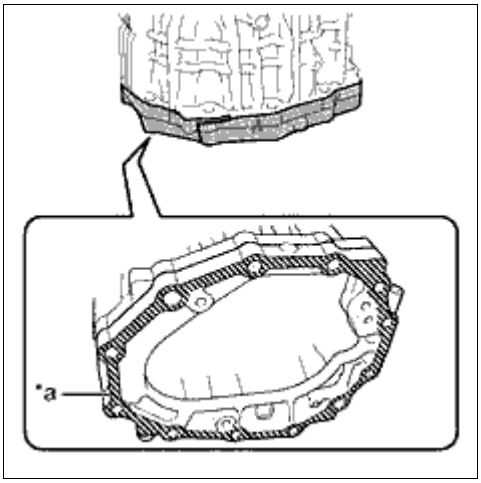
NOTICE:

Parts must be assembled within 10 minutes of application. Otherwise, the seal packing (FIPG material) must be removed and reapplied.

(e) Install the rear transmission case and intermediate plate.

Text in Illustration

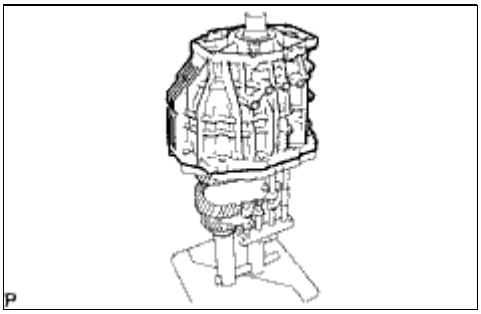
*a	Tape Application Prohibited



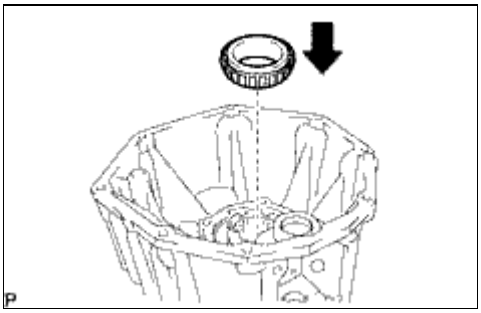
NOTICE:

- Secure the rear transmission case and intermediate plate with tape.
- Make sure that the tape does not contact the seal packing application surface of the manual transmission case sub-assembly.

(f) Install the rear transmission case.

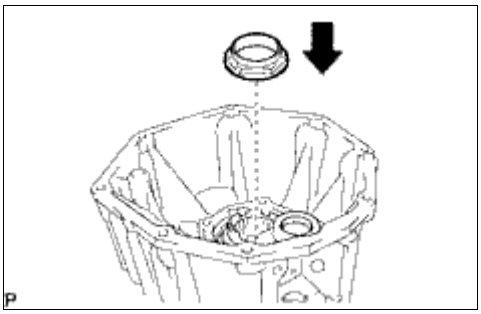


(g) Install the rear output shaft bearing to the transmission unit.



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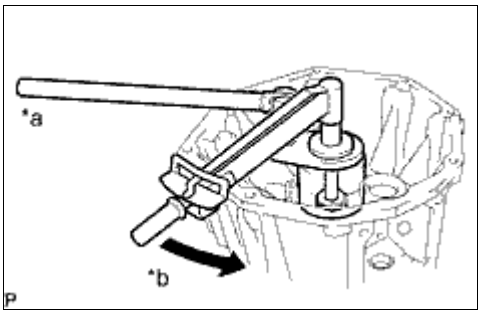
(h) Temporarily install the manual transmission output shaft rear set nut to the transmission unit.



(i) Temporarily install the manual transmission output shaft rear set nut.

Text in Illustration

*a	Hold
*b	Turn



SST: 09326-71010

SST: 09326-71030

Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

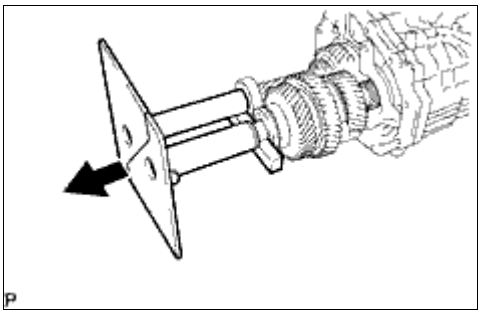
CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

NOTICE:

If the nut is not temporarily installed, the position of the rear output shaft will be unstable causing the preload to be unstable.

(j) Lay the transmission unit on its side, and then remove SST from the transmission unit as shown in the illustration.



SST: 09310-71010

CAUTION:

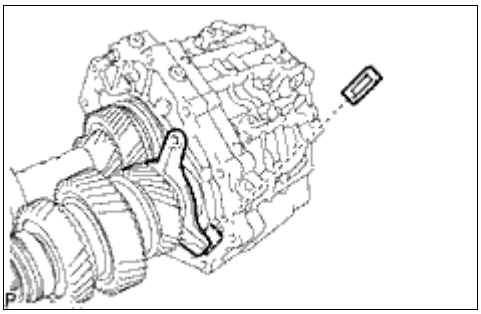
Since the manual transmission unit is very heavy, perform these procedures with 2 people.

NOTICE:

Lay the transmission unit on its side so that the shift fork shaft sub-assembly is on the bottom.

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(k) Install the transmission magnet.



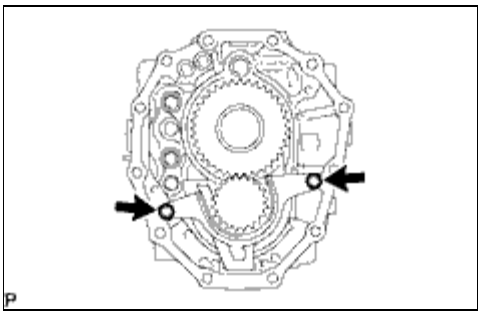
(l) Install the transmission oil separator sub-assembly (front side) to the transmission unit with the 2 bolts.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}

CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.



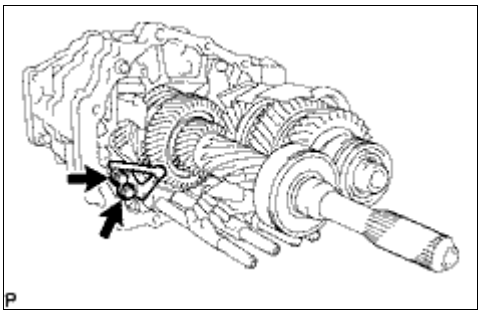
(m) Install the shift interlock plate stopper to the transmission unit with the 2 bolts.

Torque:

24 N·m {243 kgf·cm, 18ft·lbf}

CAUTION:

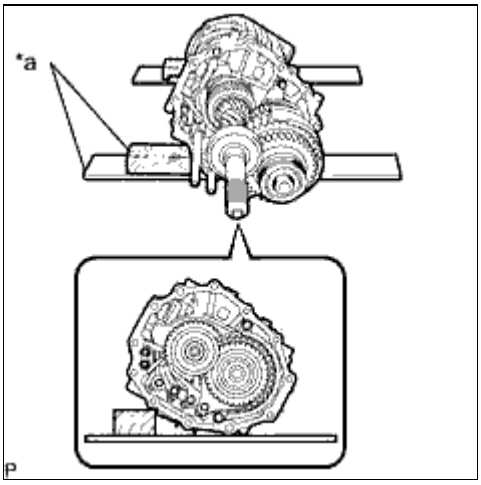
Since the manual transmission unit is very heavy, perform these procedures with 2 people.



(n) Use wooden blocks or other objects to support the corners of the transmission unit as shown in the illustration before conducting work.

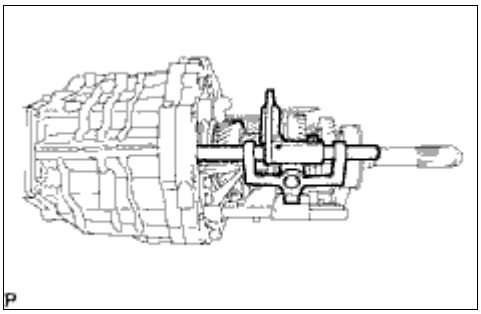
Text in Illustration

*a	Wooden Block



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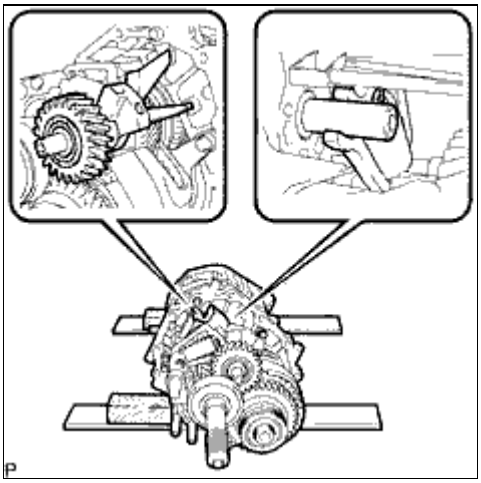
(o) Install the shift and select lever shaft sub-assembly to the transmission unit.



CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

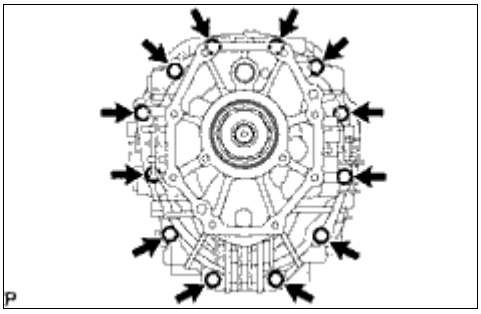
(p) Align the groove of the shift and select cam with the reverse idler shaft, and then install the reverse idler gear.



CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

(q) Install the manual transmission case sub-assembly with the 12 bolts.



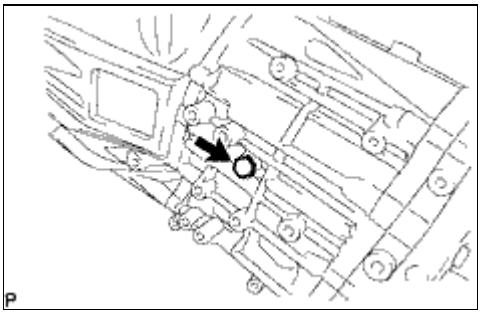
Torque:

37 N·m {377 kgf·cm, 27ft·lbf}

CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

(r) Install the reverse idler gear shaft bolt and a new gasket to the reverse idler gear shaft.



Torque:

25 N·m {255 kgf·cm, 18ft·lbf}

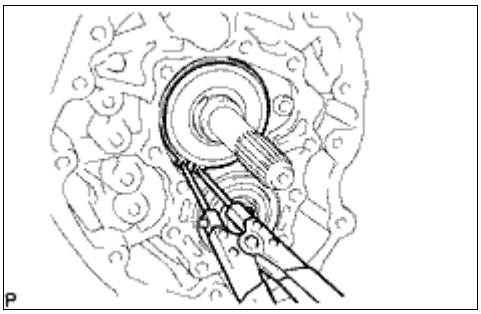
CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

27. INSTALL INPUT SHAFT SHAFT SNAP RING

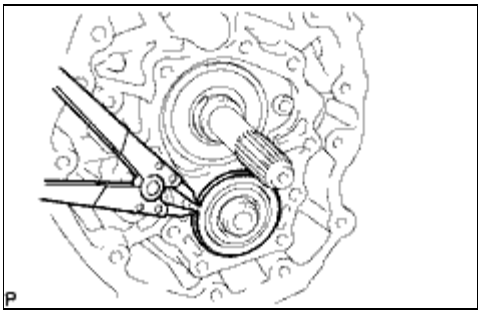
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(a) Using snap ring pliers, install a new input shaft shaft snap ring.



28. INSTALL FRONT BEARING SHAFT SNAP RING

(a) Using a snap ring expander, install a new front bearing shaft snap ring.



29. INSTALL COUNTER GEAR SHAFT NUT

(a) Using SST, secure the output shaft.

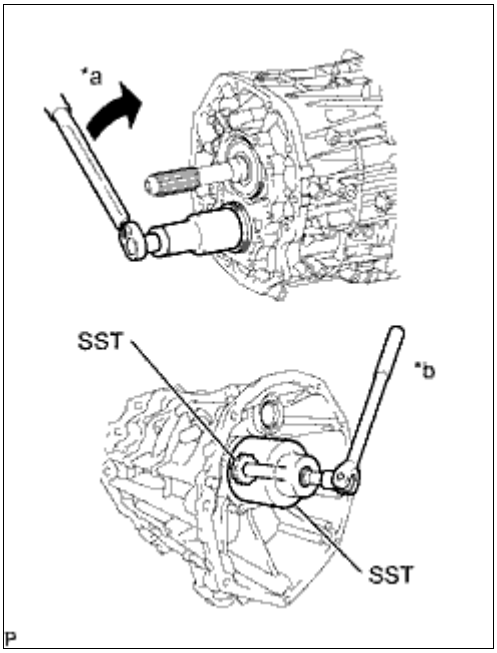
Text in Illustration

*a	Turn
*b	Hold

SST: 09326-35010

09326-03010

SST: 09326-71030



(b) Using a 41 mm socket wrench, install a new counter gear shaft nut.

Torque:

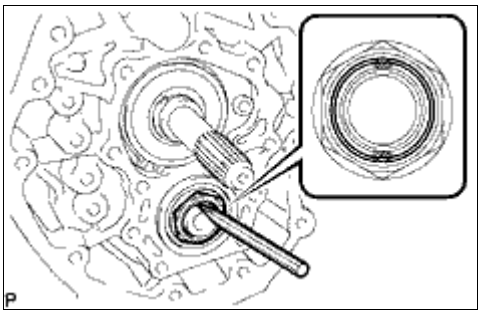
40 N·m {408 kgf·cm, 30ft·lbf}

CAUTION:

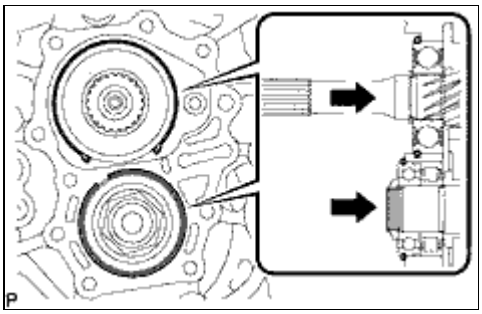
Since the manual transmission unit is very heavy, perform these procedures with 2 people.

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(c) Using a chisel and hammer, stake the counter gear shaft nut.



(d) Push in the input shaft and counter gear so that the 2 snap rings are firmly pressed into the transmission case.



Text in Illustration

➡	Push

30. INSTALL FRONT TRANSMISSION BEARING RETAINER OIL SEAL

(a) Using SST and a press, press in a new front transmission bearing retainer oil seal.

SST: 09950-60010

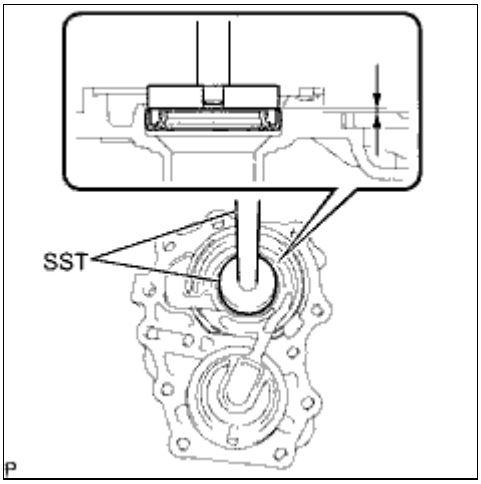
09951-00470

SST: 09950-70010

09951-07150

Standard drive in depth:

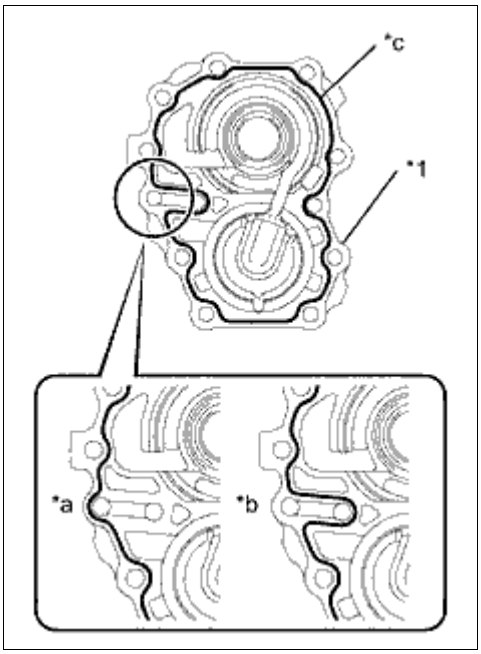
0.8 to 1.8 mm (0.0315 to 0.0708 in.)



31. INSTALL FRONT BEARING RETAINER

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(a) Apply seal packing to the front bearing retainer shown in the illustration.



Text in Illustration

*1	Front Bearing Retainer
*a	Incorrect
*b	Correct
*c	Seal Packing

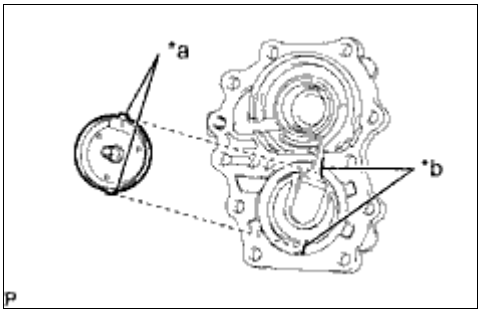
Seal Packing:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

NOTICE:

Parts must be assembled within 10 minutes of application. Otherwise, the seal packing (FIPG material) must be removed and reapplied.

(b) Install the No. 1 oil receiver pipe to the front bearing retainer.



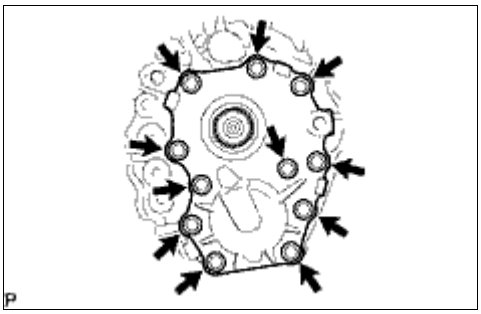
Text in Illustration

*a	Protrusion
*b	Groove

HINT:

Align the protrusion of the No. 1 oil receiver pipe with the groove of the front bearing retainer.

(c) Install the front bearing retainer to the front transmission case with new 11 bolts.



Torque:

40 N·m {408 kgf·cm, 30ft·lbf}

CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

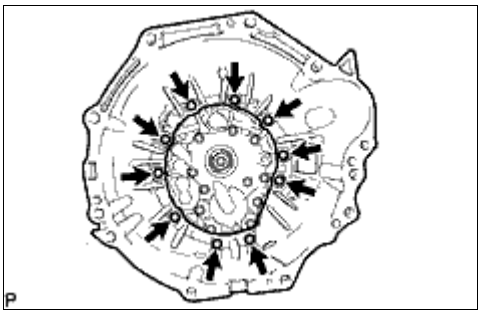
32. INSTALL CLUTCH HOUSING

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(a) Install the clutch housing to the manual transmission case sub-assembly with the 10 bolts.

Torque:

36 N·m {367 kgf·cm, 27ft·lbf}



CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

33. TIGHTEN MANUAL TRANSMISSION OUTPUT SHAFT REAR SET NUT

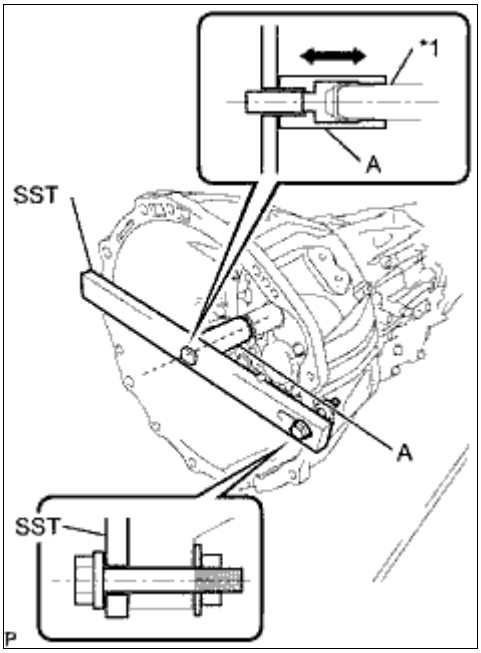
CAUTION:

Since the manual transmission unit is very heavy, perform these procedures with 2 people.

(a) Engage the gear, and then secure the input shaft using SST.

Text in Illustration

*1	Input Shaft



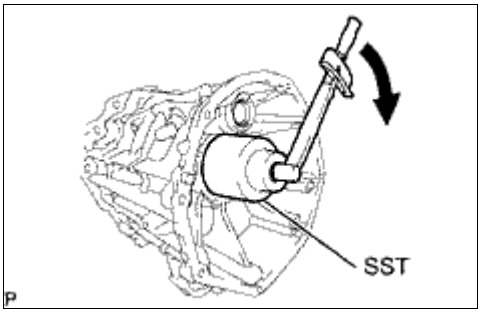
SST: 09322-35010

09322-03010
09322-03020
09322-03030
90105-12087
90170-12030
94622-51200

HINT:

- Install SST securely so that the part labeled A is in-line with the input shaft.
- Make sure that the part labeled A moves back and forth by hand after installing SST.

(b) Using an L-type handle and SST, install the manual transmission output shaft rear set nut to the output shaft sub-assembly.



SST: 09326-35010

09326-03010

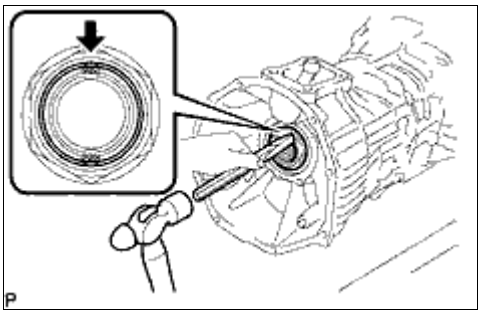
Torque:

187 N·m {1907 kgf·cm, 138ft·lbf}

34. STAKE MANUAL TRANSMISSION OUTPUT SHAFT REAR SET NUT

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(a) Using a chisel and hammer, stake the manual transmission output shaft rear set nut.

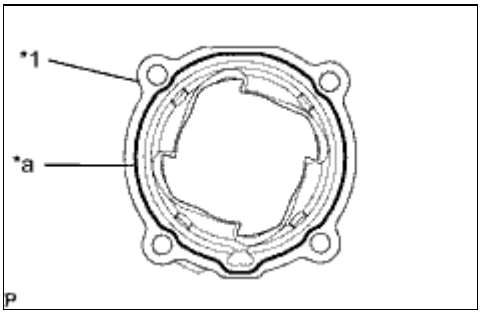


35. INSTALL MANUAL TRANSMISSION CASE COVER

(a) Apply seal packing to the manual transmission case cover shown in the illustration.

Text in Illustration

*1	Manual Transmission Case Cover
*a	Seal Packing



Seal packing:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

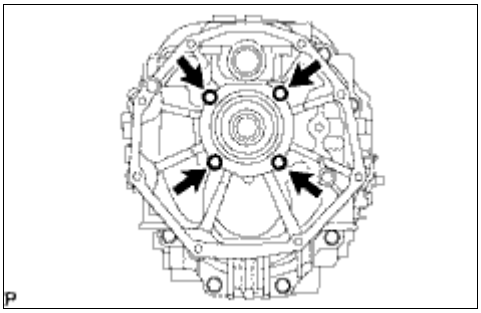
NOTICE:

Parts must be assembled within 10 minutes of application. Otherwise, the seal packing (FIPG material) must be removed and reapplied.

(b) Install the manual transmission case cover to the rear transmission case with the 4 bolts.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



36. INSTALL SHIFT LEVER HOUSING

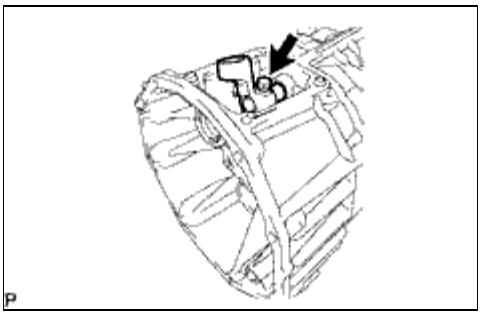
(a) Install the shift lever housing with a new bolt.

Torque:

50 N·m {511 kgf·cm, 37ft·lbf}

NOTICE:

Do not damage the sealing surface of the control shift lever retainer sub-assembly.



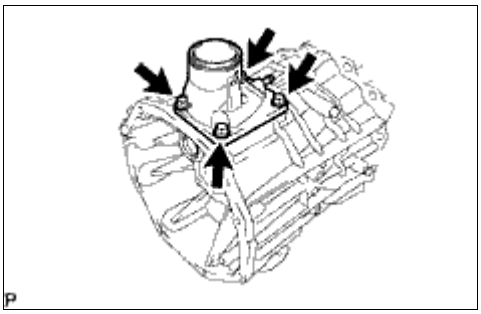
37. INSTALL FLOOR SHIFT CONTROL SHIFT LEVER RETAINER SUB-ASSEMBLY

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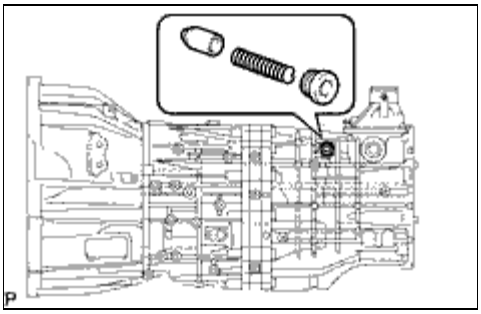
(a) Install a new control shift lever retainer gasket and the floor shift control shift lever retainer sub-assembly to the rear transmission case with the 4 bolts.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



38. INSTALL LOCK BALL PIN



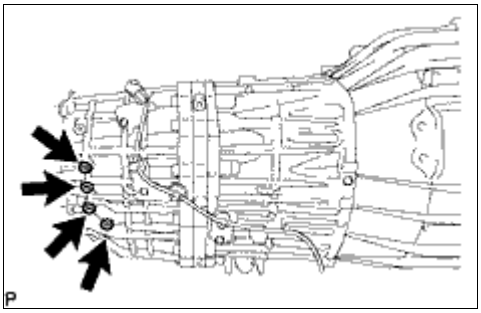
(a) Install the lock ball pin and shift and select lever spring to the rear transmission case.

(b) Using a 10 mm hexagon wrench, install a new No. 2 straight screw plug with head to the rear transmission case.

Torque:

25 N·m {250 kgf·cm, 18ft·lbf}

39. INSTALL SHAFT DETENT BALL



(a) Install the 4 shaft detent balls and 4 shift detent ball compression springs to the rear transmission case.

(b) Using a 6 mm hexagon wrench, install 4 new shift detent ball plugs to the rear transmission case.

Torque:

22 N·m {224 kgf·cm, 16ft·lbf}

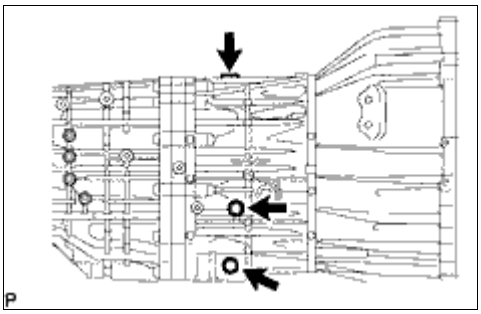
40. INSTALL MANUAL TRANSMISSION CASE PLUG

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(a) Install a new gasket and the manual transmission filler plug (with label).

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}



(b) Install a new gasket and the drain plug sub-assembly (without label).

Torque:

37 N·m {377 kgf·cm, 27ft·lbf}

(c) Using a 10 hexagon wrench, install a new gasket and the straight screw plug with head.

Torque:

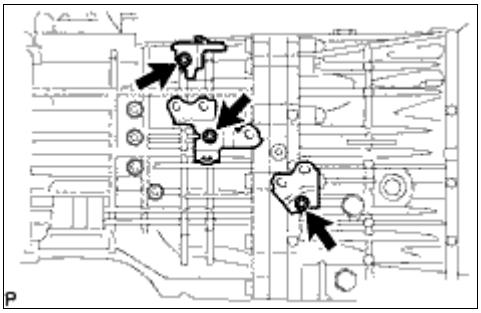
37 N·m {377 kgf·cm, 27ft·lbf}

41. INSTALL BACK-UP LIGHT SWITCH BRACKET

(a) Install the 3 back-up light switch brackets with the 3 bolts.

Torque:

13 N·m {128 kgf·cm, 9ft·lbf}



42. INSTALL BACK-UP LIGHT SWITCH ASSEMBLY INFO

43. INSTALL RELEASE FORK SUPPORT

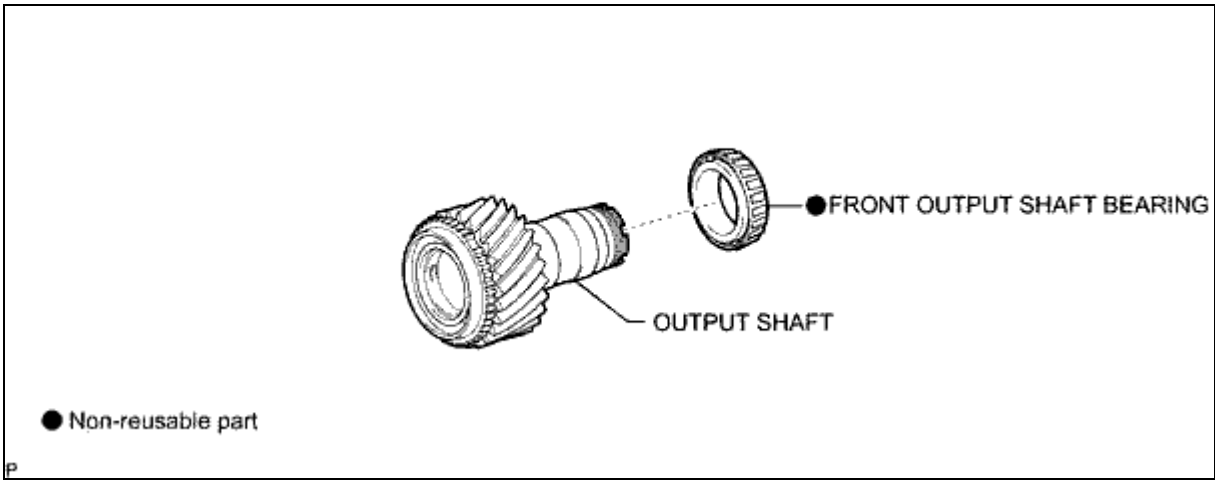
INFO

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Last Modified: 11-13-2015	6.6 K	**Doc ID:** RM00000179200TX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: OUTPUT SHAFT: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



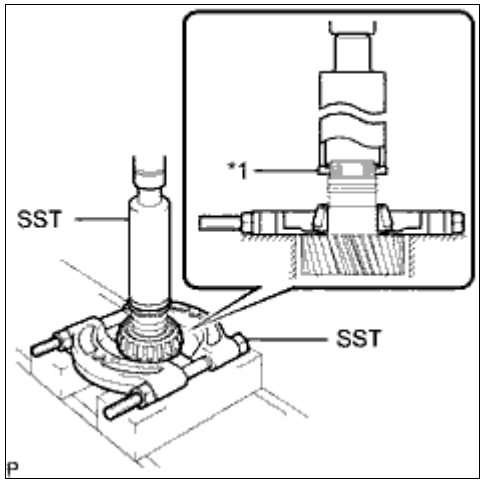
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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM000000179300QX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: OUTPUT SHAFT: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. REMOVE FRONT OUTPUT SHAFT BEARING

(a) Temporarily install the manual transmission output shaft rear set nut to the output shaft.



Text in Illustration

*1	Manual Transmission Output Shaft Rear Set Nut

(b) Using SST and a press, remove the front output shaft bearing from the output shaft.

SST: 09316-60011

09316-00011

SST: 09950-00020

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Last Modified: 11-13-2015	6.6 G	**Doc ID:** RM000000179100QX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: OUTPUT SHAFT: INSPECTION; 2016 MY Tacoma [08/2015 -]		

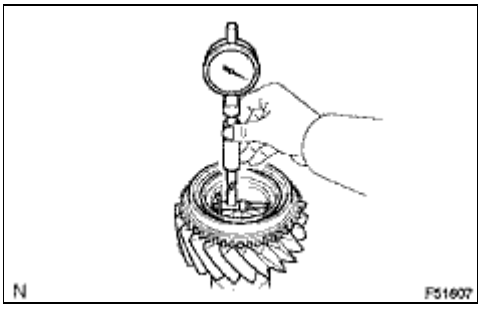
INSPECTION

1. INSPECT OUTPUT SHAFT

(a) Using a cylinder gauge, measure the inside diameter of the output shaft.

Standard inside diameter:
45.009 to 45.025 mm (1.77201 to 1.7726 in.)
Maximum inside diameter:
45.025 mm (1.7726 in.)

If the diameter is more than the maximum, replace the output shaft.



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Last Modified: 11-13-2015	6.6 A	**Doc ID:** RM00000179400QX
Model Year Start: 2016	**Model:** Tacoma	**Prod Date Range:** [08/2015 -]
Title: RC62F MANUAL TRANSMISSION: OUTPUT SHAFT: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

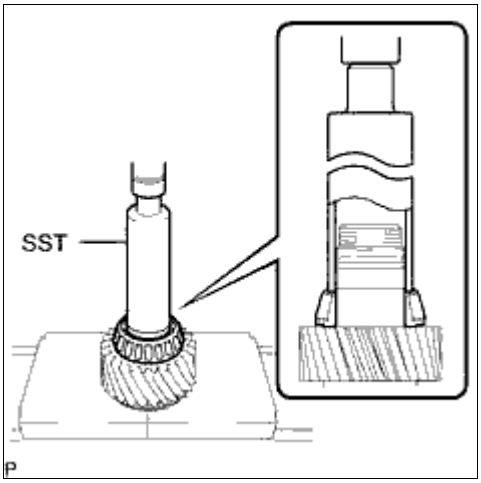
REASSEMBLY

1. INSTALL FRONT OUTPUT SHAFT BEARING

(a) Using SST and a press, install a new front output shaft bearing to the output shaft.

SST: 09316-60011

09316-00011



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